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ABSTRACT

Intended to assist Agency for International Development (AID) officers, advisors, and health officials in incorporating health planning into national plans for economic development, this fifth of ten manuals in the International Health Planning Methods Series deals with health facilities planning in developing countries. While several specific examples are provided to illustrate particular points throughout the text, the emphasis is placed on developing a conceptual framework useful as a model planning tool to be adapted to meet local needs and resources. Chapter 1 provides an overview of the area. Chapters 2-4 describe the preliminary assessment, field assessment, and planning processes. Focus is on the impact of geographical, climatic, and sociocultural factors on architectural design. Appendixes include a listing of publications with the most current data and sample assessment forms. A supporting document in the International Health Reference Series containing a literature review and annotated bibliography is available separately as CE 024 228. (YLB)

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International Health
Planning Methods Series

5

Health Facilities Planning

# *Guidelines for Analysis of Health Facilities Planning in Developing Countries*

U.S. DEPARTMENT OF HEALTH
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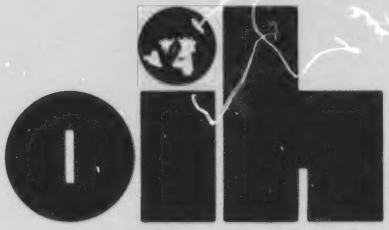
# Guidelines for Analysis of Health Facilities Planning



U.S. Department of Health, Education, and Welfare
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## PREFACE TO THE SERIES

The International Health Planning Methods Series has been developed by the Office of International Health, Public Health Service on request of the Agency for International Development.

The series consists of ten basic volumes which cover a variety of health issues considered vital for effective development planning. These ten volumes are supplemented by six additional works in the International Health Reference Series, which list resource and reference material in the same subject areas.

The International Health Planning Methods Series is intended to assist health sector advisors, administrators and planners in countries where the Agency for International Development supports health related activities. Each manual attempts to be both a practical tool and a source book in a specialized area of concern. Contributors to these volumes are recognized authorities with many years of experience in specialized fields. Specific methods for collecting information and using it in the planning process are included in each manual.

The six supporting documents in the International Health Reference Series contain reports of literature surveys and bibliographies in selected subject areas. These are intended for the serious researcher and are less appropriate for broad field distribution.

The volumes in the International Health Planning Methods Series contain the collective effort of dozens of experienced professionals who have contributed knowledge, research and organizational skills. Through this effort they hope to provide the AID field officer and his host country counterparts with a systematic approach to health planning in developing countries.

## PREFACE TO VOLUME FIVE

This manual deals with the subject of health facilities planning in developing countries. It is the fifth volume in a series of works known collectively as the International Health Planning Methods Series.

The series was produced by the Office of International Health as requested by the Agency for International Development to provide AID advisors and national health officials in developing countries with critically needed guidelines for incorporating health planning into national plans for economic development.

In many developing countries, health facilities have developed over the years more or less haphazardly. Now that more and more countries are adopting some form of national health policy, there is a growing recognition that health facilities should be based upon a realistic assessment of the needs of the resident population. Also there is greater emphasis on the provision of health facilities for the rural population.

This manual provides a framework for the planner who is concerned with the development and distribution of various types of health care facilities.

Preparation of this volume was undertaken for the Office of International Health by E. H. White & Co., Management Consultants, San Francisco, California. The primary authors of this manual were Dennis R. Porter, Robert J. Staff and Melvin Whitfield.

While several specific examples are provided to illustrate particular points throughout the text, the emphasis in this manual has been placed on developing a conceptual framework that is useful as a model planning tool that can be adapted to meet local needs and resources.

For example, geographical and climatic factors should have great impact on the architectural design and site selection of the health facility. While general concerns have been identified here, no attempt has been made to provide a detailed architectural design to meet the needs of each climatic or geographical condition. Specific adaptation must be made by the planner himself. Similarly, health facilities architecture should be compatible with existing socio-cultural factors in the planning region.

It should be emphasized that the present work makes no claim to be comprehensive in the field of health facilities planning. Constraints of time and funding have made a degree of selection and omission unavoidable. Additional works of reference in this field have been listed in a literature review and annotated bibliography included in the accompanying series of International Health Reference documents.

The authors of this manual have frequently expressed personal points of view with reference to specific health facilities planning practices. While their viewpoints generally coincide with organizations or agencies with whom they are associated, the material in this text should not be construed to reflect the official policy of any agency or organization.

Paul I. Ahmed
Project Officer
Office of International Health

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Each volume in the International Health Planning Methods Series has been the work of many people. In addition to the primary authors, each manual has involved government reviewers and reviewers from positions outside government, editors, revisors, and numerous technical and support personnel. Substantial contributions have been made by manual advisors, who provided the authors with the benefit of their knowledge and experience in the fields under study.

With reference to Volume 5: Health Facilities Planning, special thanks are in order for contributions made by Rex W. Allen, Malcolm H. Merrill, and Paul Zukin.

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While the present work could not have been completed without the assistance of these individuals, responsibility for the content of this manual rests solely with the authors.

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# CHAPTER ONE

# INTRODUCTION

## Defining Health Facilities

Health facilities in the manual refer to any facility, structure, or vehicle where health, medical care, and/or health education are provided to people in need of such services. These facilities can be categorized by:

- whether they are mobile or stationary
- according to location
- rural or urban
- services provided in a defined catchment area
- type of funding organization; i.e., whether publically owned and operated or operated for profit or by a non-profit organization

The literature refers to a heirarchy of facilities which is based upon a network of facilities in a country or regions of a country. These facilities are defined according to type and extent of services rendered and conform to definitions of primary (health post), secondary (combined health center hospital with medical, surgical, ob-gyn, and pediatric in- and out-patients), and tertiary facilities.

Tertiary facilities are those large teaching hospitals found in a major city, and usually have direct ties with a medical school. Such medical centers, as they are frequently called, have highly specialized departments (e.g., opthalmology, ENT, urology, neurosurgery) capable of handling the patients of a region who know they need such services, or who have been referred. The secondary facilities are smaller hospitals, combined with health centers where feasible, that are able to provide routine care for the majority of patients except those needing specialized services, but are usually accessible to peripheral rural areas. Primary care facilities are where ambulatory day-to-day services are provided to small local groups of patients. These lack sophisticated diagnostic and treatment possibilities, and usually do not have physicians regularly in attendance, if at all. Rural health posts providing maternal and child health ambulatory services fall under the definition of primary facilities, as do dispensaries.

It is essential that the users of this manual distinguish between a primary health facility (the physical plant comprising a simple structure that is equipped and furnished) and primary health care. In defining the latter, delegates from 140 nations and numerous nongovernmental organizations met in September 1978 at the International Conference on Primary Health Care and adopted unanimously the "Declaration of Alma-Ata."

This declaration " . . . calls for urgent and effective international and national action to develop and implement primary health care throughout the world and particularly in developing countries." The full text of this declaration is provided as an appendix to this manual.

Primary health care "constitutes the first element of a continuing health care process" and as such should be given in all types of health facilities

whether primary, secondary, or tertiary. This manual on assessing and planning a health delivery system and the facilities that are required for its implementation, focuses on the primary facility in which primary health care is provided to those who have little or no health services.

In assessing and planning, however, it is essential to keep in mind that primary health care "should be sustained by integrated, functional and mutually-supportive referral systems, leading to the progressive improvement of comprehensive health care for all, and giving priority to those most in need."

It is frequently at the level of providing primary health care that the networks fail since the facilities are generally insufficient in number, and those that do exist are all too often inadequately staffed, poorly equipped, and rarely provided with the requisite logistical support.

Preventive activities and education can be provided in primary facilities. However, the allocation of resources for certain public health functions (such as environmental sanitation and nutrition education) often conflicts with other priorities. The trade-offs between 1) allocating resources for tertiary and secondary facilities which provide stereotypes of professional medical care, and 2) encouraging the development of auxiliary personnel staffing for primary facilities such as rural health posts, provide a central concern everywhere in the examination of health facilities planning and the implications that impinge on establishing a workable and effective health services distribution system.

The conventional facilities hierarchy outlined above does not include drugstores and pharmacies, the work spaces of traditional healers, nor school health education programs; however, services such as these should be taken into consideration when planning.

Some Basic Considerations When Planning a Health Facilities Distribution System

There are a number of public policy considerations which reflect the state of the art in the late 1970s which should be addressed. These considerations directly impact the nature of public policy regarding health facilities planning and the distribution of health services to the residents, especially the rural and urban poor.

1. National Development. There is a move away from development being measured in terms of Gross National Product and strictly economic indicators towards the use of social indicators which measure improved nutrition, employability, personal productivity, education, personal and social health and the redistribution of national resources.

2. The Health Sector. This sector is comprised of nutrition, community water systems and supplies, sanitation activities, community development and environmental engineering as well as preventive (therapeutic) and curative health systems; of course, rehabilitation is included as well.

3. Major Health Advances. It is generally accepted that the major health advances in the industrialized countries came as a result of improved water supplies, environmental sanitation, personal hygiene, nutrition, housing and education. The goal of good health is directly affected by public and private policies (particularly regarding financing) which reach far beyond those regarding only the health sector.

4. Resources for Health Plans. There may be major differences between the long-range goals and objectives of formal health plans and the resources currently available to achieve them, even in a phased or step-by-step development.

5. Resource Allocation for Health Projects. It is very difficult to allocate priorities among health goals and objectives because of the overlapping

nature of the causes and effects of poor personal and social health. Rather than describing the problems and services in two-dimensional charts and diagrams, the problems and services should be viewed as webs of interfacing subsystems. The subsystems are beginning to be defined by their interrelations and interchanges. This makes the political and organizational variables as central to the allocative decisions or systems being planned as are the services, funds, facilities and users themselves.

6. Competing Health Program Objectives. There are a number of intervention objectives which compete for resources. They include:

- Programs to assist the most people or largest problems, disease control, or access to primary care.
- Programs designed to reach the easiest to serve.
- Programs designed for dramatic results, e.g., a specific disease or environmental control campaign.
- Programs aimed at serving the least accessible, e.g., racial or ethnic minorities in remote areas.
- Programs aimed at those with the most immediately apparent socio-economic potential, e.g., middle class, civil servants, workers, students.
- Programs which serve those with major social responsibilities, i.e., military, heads of households, community leaders, students.
- Programs which require the longest sequence of projects/activities, e.g., integrated national or regional health distribution systems.
- Programs which stimulate self-help and decentralized leadership, e.g., prevention and disease control, local self-help.
- Programs which prepare decision makers to accept changes in resource allocation, e.g., planning programs, experimental and demonstration programs.

7. Community Participation. When there is a means to formulate health service demands, community participation is a major force in decision-making. To move ahead on any facilities plans without community participation is to court failure through lack of support and financing, or at best ineffective and expensive under-utilization of the facility.

8. Health Professionals Participation. Where there is a coherent body of health professionals, their input will be disproportionate to their numbers. Consequently, their input is to be considered in terms of their interests, obligations, and competencies they have to offer.

Major Public Policy Issues in Health Facilities Planning

The following issues reflect major factors which should be considered in performing or planning for the development of health facilities.

1. How Are Health Facilities Resources Being Distributed Within the Subject Country?

Equity considerations require that special attention be paid to the allocation of health facilities resources within a country. Two considerations are important: how existing health facilities are distributed throughout the country; and what type of facility is located where.

Background research should yield the distribution of health facilities, their condition (worth improving/extending) and the plans for future development of new facilities. The tremendous capital requirements for modern teaching medical centers and regional hospitals often preclude the establishment of multiple primary care facilities or indigenous facilities which could serve a wider population that otherwise would not have access to health services. The extreme scarcity of health resources in many countries encourages self-help facility development. This self-help could provide a greater impact in terms of equity, efficiency and effectiveness if provided with guidelines, technical advisory assistance, etc.

2. How Well Is Health Facility Planning Integrated With Other Planning?

The development of primary health care occurs within the context of national development planning goals and strategies. Planning and analysis of health facility development must occur within the wider development context, especially if there is a regionalized overall development strategy.

When analyzing the integration of health provisions in overall country development planning, all legal entities within a country that participate in providing services should be considered and coded according to a scheme depicted by the following classification:

Government (National, federal, or central)
- Military
- Other

Nongovernment (not-for-profit)
- Religious
- Other voluntary

Investor (for-profit)
- Private clinics

In addition, international organizations (public) support selected types of health facility development (although usually not the "for-profit" category) through both multilateral (e.g., WHO, UNICEF) and bilateral (e.g., U.S. AID) agencies. Private international bodies (e.g., The Albert Schweitzer Foundation) also provide assistance. All of these resources should be deployed, where possible, to broaden the coverage of health facilities and promote services which are acceptable to the local populace. This is especially the case in more remote rural areas.

3. What Role Does the Local Community Play in Defining Public Health Intervention Strategies, Fundamental Health Care Needs, and the Development of Manpower and Primary Facilities Resources to Meet These Requirements?

Planning and assessment must leave room for ample local participation in problem analysis and problem solution. The time has long since passed when planners in the national capital, or even worse--from another country, should unilaterally determine what is appropriate for a particular community or service area. Obviously, this should not be an accepted professional practice.

In the planning and assessment it is most important to further determine what local resources (with emphasis on manpower potential) are available to assist in providing basic "preventive" and "curative" programs as well as the development of primary health care facilities to accommodate these very fundamental services. Resources to be determined include capital, labor, land, information and leadership/managerial skills. The development of a plan for primary health care facilities (health posts) can be the responsibility of a local community working with outside advisory assistance. The community then relies on local resources to assist in constructing the facility. Specifications for such a facility should be developed with skilled assistance in order to profit from experiences elsewhere, thus avoiding expensive errors and discouraging delays.

4. What Are the Trade-Offs Between Allocating Capital to Tertiary and Secondary Facilities and Allocating It to Primary Facilities?

The health sector is oftentimes a low priority in third world national budgets. Capital expenditures for tertiary and secondary facilities can easily consume the major part of annual health sector budgets. Is equity and efficiency served by these large capital expenditures in building a health infrastructure? Allocations to tertiary and secondary facilities that support an urban, professionalized model of health care may provide only limited services to the catchment area. These facilities tend to serve mainly the affluent and influential

members of the society and certain specialized services. National facility analysis and planning should examine the costs and benefits between allocating resources to primary facilities and other health facilities. It should be recognized, however, that an appropriate balance is mandatory in order to have primary health care services, for these cannot long exist effectively without clinical and logistical support from the secondary and tertiary sources.

## CHAPTER TWO

## PRELIMINARY ASSESSMENT

The purpose of the preliminary assessment is to make maximum use of time, skills, and resources before conducting a large scale field assessment. The United States consultants are often confronted with short deadlines while attempting to conduct field assignments. In-country health planners are greatly overworked and generally have limited personnel and financial resources. The overall aim of the approach is to provide basic information and determine areas for additional research before conducting any detailed field studies. The preliminary assessment survey may eliminate many of the traditional mistakes occurring in the field, and also may serve as a determinant in deciding on the most feasible approach options in assessing health facilities needs for any developing country. As indicated elsewhere in this manual, ultimately the approach should be decided on in the developing country during the field assessment, in close collaboration with host country authorities.

### Preliminary Appraisal

A general description of the major health characteristics of any area is a necessary prerequisite in the health facility assessment process. This begins with a review of available literature followed by a U. S. Department of State, Agency for International Development, briefing in Washington, D.C. and in the subject country. Information provided by the country's Ministry of Health and other Ministries is also reviewed. Obtaining information from the international organizations, particularly the World Health Organization (WHO), the Food and Agriculture Organization (FAO), and the United Nations Childrens Fund (UNICEF) is part of the literature review. Furthermore, religious and other non-governmental organizations may provide important information. From these various sources, useful data related to the general health conditions of a particular area are obtained, which provide a broad health profile of the country or region to be assessed.

Religious groups and organizations have a long history of health care in developing countries. Religiously affiliated groups have for many years been financing, administering, and providing health services and facilities to areas in need of support. One of their greatest contributions perhaps is in the operation of primary health delivery services and hospitals, especially in Latin American, Africa, and Asia. Some examples are the Catholic Church, World Council of Churches, the Amerifan Joint Distribution Committee, and the Conference of Missionary Societies in Great Britain and Ireland. They are a useful data resource.

Studies conducted by international organizations or the host country of specific health situations are another source of pertinent data. In addition, the analyst should be familiar with the epidemiological profile, consisting of mortality rate and morbidity rate as indicators of incidence and prevalence. These kinds of statistical data can be obtained from the above-mentioned sources.

Data for Preliminary Assessment

Data requirements shown below form the basis for a reasonably thorough preliminary analysis of the indicators relevant to assessing and planning health facilities. While the data suggests national measures, they can apply to regional assessment and planning. The data requirements are presented in outline form. The data required were derived from existing studies and resources. Because the adequacy of the data can be questionable, a weighting procedure for determining the relevance and accuracy of the information is proposed. The purpose of the preliminary analysis is to spotlight areas which require additional study or more detailed analysis in order to achieve the goals and objectives of the planning and analysis.

DATA BASE FOR PRELIMINARY ASSESSMENT

| INDICATOR | MEASURE |
|---|---|
| 1. Health Status | |
| a. Demographic characteristics | Map of population distribution from 1950-1990 |
| b. Patterns of Morbidity and Mortality | Map of morbidity and mortality from 1950 to present |
| c. Communicable Diseases | Map of communicable diseases from 1950 to present |
| d. Sanitation | Map ranking water quality and sanitation by measures of adequate, inadequate, and severe problems |
| 3. Nutrition | Incidence and degree of malnutrition (Gomez scale by area mapped for the country) |
| | Basic diet based upon local or regional foods, dietary habits and taboos |
| 2. Health Care Services | |
| a. Infrastructure | Distribution of public health personnel mapped nationally |
| b. Facilities | Distribution of tertiary, secondary, and primary health care facilities mapped nationally |
| | Distribution of facilities by type which are planned |
| | Number of beds and type of service by each facility |
| c. Research facilities, medical schools, facilities, mobile clinics and non-public facilities not covered above | Map the facilities with appropriate codes |
| | Describe the services of the facilities and coverage |
| 3. Health Resources | |
| a. Goals and objectives | National Health Budget and five year projections |
| | Measures of achievement and estimates of probability achievement |

| | | |
|---|---|---|
| 3. | Health Resources (cont'd) | |
| | a. Goals and objectives (cont'd) | Measures of achievement and estimates of probability achievement |
| | b. Major health programs | Estimates of annual resource requirements and how resources distributed over national space |
| | c. Private Resources and Programs-National | Estimated annual budgets and estimates of probability of achievement |
| | d. International Resources and Programs | Estimates annual budgets and estimates of probability of achievement |
| | e. Estimates of new assistance | Same as above (d) |
| | f. Untapped local resources | Estimates of local self-help capabilities, especially labor for facilities construction mapped nationally |
| 4. | National Development Indicators | |
| | a. Goals and objectives | Estimates of probability of achievement |
| | b. Major development programs | Estimates of probability of achievement<br>Distribution of programs over national space<br>Links with national health programs |
| | c. Economic base (natural resources and export industries including tourism) | Map of economic base by nature of resource<br>Map of economic base by nature of industrial group (e.g., Standard Industrial Classification (SIC) |
| | d. Income distribution | National map of distribution |
| | e. Patterns of land ownership | National map of ownership by percentage |
| | f. Employment | National map of employment/unemployment<br>National map of type of employment<br>National map of levels of achieved education |
| 5. | Sociopolitical | |
| | a. Political economy over time | Narrative of the changes in the political economy over the last 100 years or more if major historical changes |
| | b. Political process | Narrative of constitution, branches of government and nature of political power |
| | c. Key institutions | Ranking of key institutions influencing political power |
| | d. Key variables impacting social change | Listing of variables which appear to impact social change |
| 6. | Health Related problems | Obtain topographical map, climate and temperature data, elevation, mountains. Also, existing and projected roads, waterways, facilities for landing planes. List the obvious problems related to improving primary health care-logistics, transportation, communication, drug supplies, personnel, customs, policies. This is expected to look like a shopping list which rounds out the major issues identified in the preliminary analysis. |

These indicators form the data base for an informed examination of the basic status of health facilities development and primary health care in the subject country or region. Measures which are based upon very questionable data should be footnoted or otherwise coded as a warning of possible inaccuracies. In each indicator component the preliminary analysis should yield a set of basic concerns or issues which seem the most relevant for further consideration. The preliminary analysis can be organized as follows:

ORGANIZATION OF PRELIMINARY ANALYSIS

| | | |
|---|---|---|
| STEP A: | PROBLEM IDENTIFICATION | 1. Health Status Data<br>6. Health Related Problems Data |
| STEP B: | PROBLEM CONTEXT | 2. Health Care Service Data<br>4. National Development Data<br>5. Sociopolitical Data |
| STEP C: | RESOURCES FOR SOLVING PROBLEM | 3. Health Resources Data |
| STEP D: | ALTERNATIVE USES FOR HEALTH FACILITIES RESOURCES | (List Major Alternatives Based on Analysis of Preceding) |
| STEP E: | ASSESSMENT OF ALTERNATIVES | |

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Building Elements and Techniques

Floors: In humid climates the floor should be designed so that it prevents moisture from the ground from entering the building. Furthermore, the floor should be stable, durable, and washable. Washable floors are necessary for hygienic considerations. Materials should be selected that will facilitate cleaning and maintenance.

Walls: Walls containing air in their cavities are useful only if air is permitted free movement thereby helping to keep inner wall temperatures stable. Sealed and trapped air in cavity walls does not help in cooling, but may be used as insulation.

Roofs: The roof is subject to the greatest climatic stress, more than any other building element. The same basic ideas apply to the roof as to the walls. However, roofs may take many different shapes. The various traditional shapes of roofs often indicate the most appropriate construction suitable for local conditions. It will be noted that the flat roof is increasingly being used due to ease of construction and almost entirely without regard to climate.

In hot climates roofs should have a high thermal resistance and be highly reflective. Further cooling can be accomplished in certain areas by covering the surface with water where evaporative cooling can be obtained; water may also be sprayed on or around the building as temperatures reach critical limits. Where roof ponding is used, measures should be provided to control mosquito breeding.

Once the preliminary analysis has progress to Step E., assessment of alternatives is needed. The figure below provides a simple mechanism for ranking alternative facilities development plan.

DECISION CRITERIA FOR RANKING ALTERNATIVE FACILITIES DEVELOPMENT PLAN

| COMPARISON FACTORS | DESIRABILITY | | | UTILITY | | | | FEASIBILITY | | | | | IMPORTANCE | | | | | TOTAL |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| FACILITIES STRATEGIES | Desirable | Somewhat Desirable | Somewhat Undesirable | Useful | Slightly Useful | Doubtful | Not Very Useful | Very Feasible | Possibly Feasible | Doubtful | Possibly Not Feasible | Definitely Not Feasible | Very Important | Important | Doubtful | Slightly Important | Unimportant | ALL FACTORS COMBINED FOR EACH STRATEGY |
| STRATEGY 1 | | | | | | | | | | | | | | | | | | |
| STRATEGY 2 | | | | | | | | | | | | | | | | | | |
| STRATEGY 3 | | | | | | | | | | | | | | | | | | |
| STRATEGY 4 | | | | | | | | | | | | | | | | | | |
| STRATEGY N | | | | | | | | | | | | | | | | | | |
| TOTALS | | | | | | | | | | | | | | | | | | |

Score each criterion on a scale of 0-5 and total the rows and columns. The row scores provide a ranking of the probable alternatives given the available information. If working in a team context have team members rank the strategies. The purpose of the exercise is to examine the most likely alternatives to current plans and programs given preliminary information.

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The result of the preliminary assessment is a set of base data, the data sources, an analysis of the most probable alternatives for use of current and projected funds, and a ranking of alternative facility development strategies given the problems, context, and resources. Missing data should be noted. While the nature of the data collection and analysis leaves much to be desired regarding completeness and depth, it provides the out-of-country analyst, the mid-level subject country health planner, and planning or assessment teams with a quick picture of the current and near-future situation and the trends leading to it. This approach is built upon existing data sources, including interviews where necessary. It also requires a minimum of quantitative analysis and data manipulation. However, it does require displaying base data on subject country maps. If the same base map is used for all mapping, then the display of data on transparent plastic or clear polyester film is a very useful tool.

## CHAPTER THREE

## THE FIELD ASSESSMENT

The major differences between the preliminary assessment and the field assessment is that the preliminary assessment relies almost entirely on existing information. The bulk of the effort is expended in searching the relevant literature and asking leading authorities for reports and studies which can yield the requisite indicators. This preliminary assessment will point out the need for data that is missing.

The field assessment assumes the need to collect original additional data and the need to use quantitative and qualitative techniques to produce more detailed information for health facilities planning. There are two basic underlying reasons for a more detailed field assessment:

- to determine the information requirements and data needed in order to formulate or assess public policy goals, objectives, strategies, plans from which a health facilities development program is sanctioned and financed (i.e., STRATEGIC PLANS); and
- to determine the specific requirements and conditions for actual regional, area or site specific planning and analysis for the development of health facilities (i.e., OPERATIONS PLANS).

In either case the use and refinement of the preliminary indicators are necessary with updating as required. This section expands on some factors and methodologies and adds additional factors. Which measures and factors are used is based upon the precise nature of the analysis assignment. There is such a variety of assignments that a precise outline of analysis procedures is not possible. It is assumed that the specific assignment will be based upon these determinations: personnel requirements; goals; outcome measures; time requirements; available funds.

A rule of thumb for the preliminary assessments is that they should not require more than eight person-months effort and should not require more than about a year to complete. The field analysis is more variable. However, for estimating purposes, no more than two calendar years and five person-years level of effort should be allocated for a field assessment. Generally, about one year and three person-years level of effort should be expended on a field assessment. "Person-year" refers to professional, technical, paraprofessional, and field work staff involved in the assignment.

The most useful determination criteria are the outcome measures. Field assessment objectives should be stated in operations terms. They should be quantified. The outcome measures provide the evaluative criteria which define the extent to which the objectives are met. The practice in the past has been to concentrate on the input measures (personnel, time, materials, and funds) leaving senior planners, administrators and donor agencies with little basis upon which to determine the success of the field assessment or planning venture. For example, the following figure provides an illustration of work program requirements for a field assessment.

## EXAMPLE OF WORK PROGRAM REQUIREMENTS FOR A FIELD ASSESSMENT

| | |
|---|---|
| AVAILABLE FUNDS: | $200,000 (US) |
| GOALS: | Determine optimum number and siting of health facilities to provide primary health care to region X; Determine the costs for the development, staffing of the optimal choices over 10 years. |
| OBJECTIVES: (The qualifications are used to establish some parameters. they are drawn from vague estimates of available resources and can be changes ad field research indicators.) | Determine strategies to make primary health care available within four hours travel time at least twice monthly to all residents of the region; Determine strategies which require between $300,000 and $500,000 annually for personnel and facilities costs over 10 years; Determine the personnel requirements for staffing the facilities with a minimum of one medical supervisor for 30 paraprofessional and auxiliary workers; Determine annual maintenance and support costs; Determine the indigeneous resources available to support this primary health care effort. (One fourth of the facilities development costs and one fourth of the personnel costs-cash or in kind will be borne by residents.) |
| OUTCOME MEASURES: | Alternative strategies, with costs and benefits required to establish a primary health care network and logistical support which permit:<br>a. Defining the services required at the various sites and the expected utilization of each facility.<br>b. All residents to access primary health care at least twice monthly within four hours from their residence.<br>c. Requiring $300,000-$500,000 annually to develop and support over 10 years. The costs can fluctuate annually.<br>d. Determining the personnel requirements with a 30/1 ratio of medical to paraprofessional supervision.<br>e. Determining the desirability, utility feasibility, and importance of the alternatives. |
| PERSONNEL REQUIREMENTS: | Undetermined |
| TIME REQUIREMENTS: | One and one-half years. |

The following subsections provide guidance in arriving at some specifications pertaining to health facilities and related factors. The function of the health facility is to provide a place where effective health services can be easily and economically delivered. While there are basic requirements regarding the provision of a sanitary, safe environment that is easy to clean and maintain, the availability of personnel funding (both for initial capital investment and operating budget), and the demand for services are basic factors which should determine the development of health facilities. While there may be a national strategy to develop a health infrastructure, it is not unusual for the rural and low-income areas to be overlooked in favor of more urban, specialized facilities. Consequently, the nature of the need for services (which increase as the availability of services increases), the availability of health personnel, and the availability of the necessary funds to support the facility and the personnel, are all factors to be considered in determining the facilities development strategy. If the "need" can be adequately demonstrated through documentation and comparison, the "demand" can be created by accepted techniques. Research, which identifies the resources to support the development strategy, is oftentimes crucial and is frequently completely overlooked.

Demographic and Disease Data/Trends

In health facilities planning, defining the context requires an understanding of the demographics and disease status of the area under study. Demography is defined as "the statistical study of human populations especially with reference to size and density, distribution, and vital statistics" (Webster's Third International Dictionary). Within the health facilities planning context suggested here, this section includes not only population statistics, but also diseases and health status, control and eradication procedures and status, health service catchment area statistics, and nutrition status. These vital statistics provide a proper understanding of the environment.

The sub-sections which follow outline data elements that assist health facilities planners in defining the environment of their plans. They are the data from which analyses are conducted. It should be remembered that not even the most sophisticated countries have all the data listed here available to its health planners. These are simply the indicators of health or illness on the broadest of scales. They will be needed in order to design a primary health care plan for policy makers that recognizes the constraints of resource scarcity.

Health planners are cautioned not to become discouraged if all of the information is unavailable. Planning is a dynamic process which is ongoing and requires increasing levels of sophistication to reach increasing levels of credibility in predicting and helping create outcomes. To achieve increased credibility, the planner must gain experience in ranking data according to priorities, increasing levels of data detail and accuracy, becoming selective about which data are most useful, refining the instruments and operations used, and understanding policy-makers' needs.

1. Population Status Indicators. The planner starts by understanding the population as a whole. These demographic data elements begin to give the planner the overall picture and define the universe within which the personnel plan will be formulated. The indicators which follow have been culled from the various population inputs that might be derived as those that are of special interest to the health planner. The level of specificity and detail around each input is generally indicative of the relative importance of the data to the planner; in some cases, the scope of this manual does not allow a more detailed explanation of demographic investigation. The planner would do well to consult the

statistical experts available to them within the appropriate organizations or institutions to which they have access.

The basic population status indicators are:

- Population Size/Number
- Geographic Distribution
- Age
- Sex
- Density
- Race/Linguistic Groups
- Religious Groups
- Economic Levels, Incomes, and distribution of that income by group within family
- Future Projections of Growth and Sources of Information
- Social Security Infrastructure and Benefits
- Education Levels
- Proportion of School Age Attending
- Literacy Levels by Area
- Labor Force and Mix by Occupation
- Percent Unemployed and Underemployed
- Socio-cultural Orientation: Religious Attitudes, Receptivity to Modern Medicine
- Estimates of health service demand and need by population group
- Acceptability to population of service types currently delivered by different categories of personnel.

2. Health Status Indicators. In developing nations, the high rates of mortality, mobidity, and population expansion may reflect the inadequacy or actual absence of health services. This problem can be graphically demonstrated by just one set of statistics: Of a total of 1.5 million physicians in the world, 1.2 million live in developed countries and serve 1 billion people leaving 300,000 physicians in the developing world to serve 2.5 billion people (WHO Statistics quoted by Russell, 1976). In effect, this means that most rural areas of the developing world have one medical doctor for every 50,000 people (compared with 1 in 700 in North America). The health problems of the poorer nations are legion and local responses to them are familiar to all health planners.

The following are the most important health and disease status indicators:

- Crude birth and death rates together with rate and direction of changes
- Infant and maternal mortality rates
- Life expectancy
- Mortality rates by age, by disease
- Density and geographic distributions of disease
- Rural-urban breakdowns of disease patterns
- Morbidity rates including data on number of out-patient visits, hospitalization (including occupancy rates and average lenght of patient stay), infectious and parasitic diseases, zoonotic disease, mental health, accidents
- Distribution of estimated physician visits and hospital discharges
- Discharges per bed per year
- Visits and discharges per full-time equivalent physician-year by sector and employer.

Control/Eradication Status Indicators. Once the planner estimates the population dynamics and the nature of key diseases statistics, it is important to understand what the country is doing about these problems. This is accomplished by the accumulation of data on control and eradication measures, on the status of various health service catchment areas, and on the nutritional status of the population.

Those indicators which allow the planner to understand the control and/or eradication of various health problems are as follows:

- Health Program Descriptions, coverage and cost, utilization, quality and efficiency in both private and public sector
- Principal providers of health programs
- Immunization programs (especially tetanus, smallpox, measles, diphtheria) with statistical results by area and population
- Maternal and child health program activities
- Percent of women receiving prenatal care
- Percent of births supervised
- Family planning programs, average and ideal family size, continuation rates, percent acceptors, legislation affecting family planning, laws affecting use of contraceptives
- Adult general medical care programs, both outpatient and inpatient
- Health education programs including occupational health efforts
- Vector control programs and successes/failures
- Environment Sanitation including: Facilities, proportion of the population served with potable water supplies and adequate sewage (acceptable by quantity and quality) together with refuse disposal, ongoing and proposed projects and programs, rate of production of new sanitation services and cost, distribution of services, urban/rural food sanitation controls
- Sewage control
- Water purification
- Floridation of water supplies
- Limitations on expansion of services and ability to apply government priorities in health service areas.

Health Service Catchment Areas Status Indicators. The preceding indicators are largely devoted to covering the country as a whole and some of the broader national control and eradication efforts. This section defines the status of health services improvement at a more local or regional level. Its focus is on education issues, facilities, transportation, and housing which are usually more regionalized than nationalized in terms of impact (if not planning frameworks). Whatever the local case, the recognition of catchment areas as the service territory provides a useful benchmark for comparisons within country. It also serves to further highlight the larger issues of distribution and utilization. Such information can influence policy makers to plan for decentralization of the health personnel pyramid away from its usual urban localization to more rural focus.

The following are health service catchment area indicators. It is understood that some of this information is available through informal local sources and therefore may not need to be "officially" collected; these should be checked with national plans, especially for transportation and communication expansion.

- Catchment area location
- Careers offered at each location (by name)
- Number per health career per location
- Enrollment in training per location per year
- Graduates per year per career per location

- Cost per student per year per career per location
- Average salary per faculty member per career per location per year
- Number of classrooms per year per location per career
- Water supply status, per location
- Health facilities per catchment area
- Numbers and distribution of inpatient and outpatient service per area including hospitals, clinics, medical laboratories, blood banks, pharmacies, ambulance services, surgical facilities, size of facilities, type of equipment, population/hospital bed ratios
- Transportation and communication infrastructure per area
- Housing conditions and settlement patterns per area
- Geography and climatic conditions per area. Obtain geographical map, climate and temperature data, elevation, mountains. Also, existing and projected roads and their condition (surfaces and seasonal use limitations), waterways, facilities for landing planes.

Nutrition Status Indicators. Nutrition deserves special emphasis since so many of the health conditions of a country or area are attributed to a lack of basic nutrients, frequently due to inadequate supply of the right kinds of foodstuffs. Nutrition is special because it cuts across national and regional and local boundaries, is not a disease as such (though malnutrition is certainly a significant state of aggravated poor health) and does not easily fall under the previous control/eradication status grouping.

Nutritional status indicators are:

- Incidence and degree of malnutrition (Gomez or Waterlow scale by area)
- Type of dietary deficiencies, links between diet/food consumed and type of deficiency diseases prevalent
- Basic diet, analysis of food consumed, imported and domestically produced, agriculture, livestock, forest, and fisheries
- Income and food prices, government price supports, average disposal income, percent spent on food, bread, government-sponsored additives to bread, soft drinks, household consumption, effects of subsistence agriculture
- Production consumer chain, seasonal variation, urban, rural, and periurban situation, storage transport, distribution, processing and marketing
- Dietary habits, taboos, population "at risk," weaning practices
- Subsystems relating to nutritional status, protein gap, effects of morbidity on nutrient need, effects of environmental sanitation on health status, parasitic load/utilization of food consumed.

Estimating Health Personnel Demand

The availability of health personnel, especially public sector health personnel, is based to a large degree on the resources allocated to their development; also to the policies which determine whether resources are allocated for the education of physicians, specialists and persons who require a great deal of training, or whether the funds are allocated for nursing, paraprofessional, other support and auxiliary personnel. The wages and fringe benefits available to health personnel especially those in the public sector or serving low and moderate income populations, to some degree determines the attrativeness of the occupations. The following figure illustrates a framework of health personnel according to preparatory requirements and categories of employment. This example is provided as an overview

## HEALTH PERSONNEL CATEGORIES BY FUNCTION & SKILL

| FUNCTION/SKILL | MEDICAL CARE | NURSING CARE | FAMILY HEALTH CARE | ALLIED HEALTH CARE | PUBLIC HEALTH |
|---|---|---|---|---|---|
| PROFESSIONAL (graduation from a course granting prof. degree | Physician (MD)<br>Specialists:<br>Surgeon<br>Pathologist<br>Psychiatrist<br>Orthopedist<br>Anesthesiologist<br>Radiologist<br>Others | Nurse (RN)<br>Degree Nurse<br>Public Health<br>Psychiatric<br>Others | Obstetrician<br>Gynecologist<br>Pediatrician<br>Nurse-Midwife<br>Registered Midwife | Health Admin'tor<br>Dentist<br>Dietician<br>Nutritionist<br>Pharmacist<br>Optometrist<br>Optician<br>Pharmacologist<br>Pharmaceutical Chemist<br>Others | Sanitary Engineer<br>Health Inspector<br>Health Officer (MD)<br>Public Health:<br>Educator<br>Biostatistician<br>Others |
| TECHNICIAN (secondary school + 2+ years of training | Physician Asst.<br>Feldsher (USSR)<br>Licentiate (India/Pakistan)<br>Behdar (Iran)<br>Medical Asst. (Pacific & Africa)<br>Clinical Officer<br>Asst. Medical Officer<br>Surgical Tech.<br>Laboratory Tech.<br>Psychiatric Tech. | Diploma Nurse<br>Licensed Practical Nurse<br>Asst. Reg. Nurse<br>Enrolled Nurse<br>Enrolled Psychi. Nurse<br>Practical Nurse | Enrolled Midwife<br>Child Health Tech.<br>Asst. Midwife<br>Middle Level Health Workers<br>Practical Midwife | Dental Hygienist<br>Dental Lab Tech.<br>Vision Therapist<br>Pharmacy Asst.<br>X-ray/deep therapy tech.<br>Pharmaceutical Asst. | Sanitarian<br>Malaria Officers<br>Health Educator<br>Health Visitor |
| AUXILIARY (Elementary or middle school + one year training usually on-the-job | Medical Corpsman<br>Village Health Worker<br>Technical Asst.<br>Physiotherapist Auxiliary<br>Occupational Therapist Aux.<br>Barefoot Doctor<br>Dresser<br>First Aid Man<br>Jr. Health Wrkr.<br>Laboratory Asst.<br>Health Promotor | Auxiliary Nurse<br>Community Nurse<br>Enrolled Community Nurse<br>Practical Community Nurse<br>Ward Helper<br>Health Worker<br>Nurses' Aide<br>Practical Nurse | Aux. Nurse Midwife<br>Child Health Assoc.<br>Village Health Worker<br>District Midwife<br>Village Midwife<br>Trained Dai<br>Auxiliary Midwife<br>Home Health Aide | Dental Assistant<br>Enrolled Nutrit'st<br>Dental Secretary<br>Hospital Support<br>Dispenser<br>Compounder<br>Dental Aide<br>Pharmacy Aide | Health Assistant<br>Sanitary Inspector<br>Public Health Aux.<br>Malaria Sprayer<br>Vaccination Worker<br>Leprosy Officer<br>Tuberculosis Visitor<br>Sleeping Sickness Officer<br>Malaria Asst. |

and is not representative of health personnel categories in all parts of the world. Its use to the health planner would be in providing a reference list of personnel by function and skill with which to establish country-specific aggregates for analysis.

The following methodologies represent reasonably simple estimating methods to determine health personnel demand. The user is cautioned that a narrow preoccupation with methodologies may overlook the broader issues of alternative uses of personnel or the manner in which problems are addressed. Inherent in the methodologies are value judgments and norms. However, the methodologies can be used comparatively to determine alternative uses of personnel, given various constraints.

1. Health Personnel/Population Ratio Method. The personnel/population ratio approach is used to assess the adequacy of the current health personnel situation, to examine the distribution of personnel, and to project in the future the number of individuals required by health personnel category.

The difficulty with the ratio method is that it does not identify nor distinguish among the users of health services, furthermore, the ratios assume that the demand for services is given and desirable, ignores ability to pay, inclination to use the services, available support services. The basic value in the health personnel/population ratio method is its simplicity. By replacing the population data with data regarding target populations or persons in target areas where there are target problems, the ratios take on more meaning.

These data are necessary to apply the method: area target population statistics, either current or projected; and the desired ratio of health personnel to population for various health personnel categories.

Manipulations of the desired ratio among the health personnel categories can provide a simple sense of alternative budget requirements and preparatory time for training to achieve the desired ratio. However, the projections make assumptions that the population, the socioeconomic characteristics, and the other demand variables remain constant unless multiple calculations are performed.

The simplest form of the health personnel/population ratio approach is:

Health Personnel Requirement By Category = Population X Desired Ratio

The current requirements are calculated by multiplying the present target population by the selected ratio; future requirements are determined by multiplying the projected population by the desired ratio.

From extant data sources the analyst determines: (1) Current target population in planning District #7 requiring basic curative services = 75,000; (2) Projected target population in planning District #7 requiring basic curative services in 1990 = 81,000. Since the computations are simple, it is wise to project future population using high, medium, and low estimates to allow for population changes; (3) The current ratio of village health workers in planning District #7 - 1.5 per 10,000 or 0.00015; (4) The desired ratio is 15/10,000 or .0015.

Computation is as follows:

Current Status - 75,000 x 0.00015 = 11.25 or 11
Present Requirement = 75,000 x 0.00015 = 112.5 or 113
Future Requirement = 81,000 x 0.0015 = 121.5 or 122 village health workers needed in 1990

Health Needs/Biologic Demand Method. The basic problem is how to determine the quantified health care needs of a defined community. One approach calls for a normative definition of good health care or possibly primary health care. This approach is called the biologic demand or professional standards approach.

In the health needs approach, the service targets or standards for consumer demand for services are set by normative professional judgment. With appropriate variations the role of the community can be included in the determination of the overall need or demand.

The data requirements for this approach are substantial. They include:

- Identification of health needs
- Agreement on modes of care and treatment for each health care need
- Treatment converted into the personnel time required to deliver the service and the time needed for treatment
- Personnel time converted into the number of fulltime persons to provide the service

The health needs approach assumes data availability relating to health needs, treatment and personnel productivity, and the nature of community's needs. The data may require original research as part of the health sector assessment. The formula is:

$$M_{rt} = \frac{P \times C \times V \times T}{W}$$ where:

$M_{rt}$ = personnel requirement in yeat t
P = population requiring a type of health care for a specific health problem in year t (current or projected)
C = average number of conditions per person per year
V = average number of specific services per person per condition per year, based upon need
T = average time required per service
W = average workload of applicable health category(ies) based upon the amount of service time (e.g., hours) provided by an average individual in applicable category per year for requisite service.

SAMPLE:

$$M_{rt} = \frac{10{,}000 \times 2.0 \times 2.0 \times 0.2 \text{ hours}}{1{,}000 \text{ hrs service time}} = 8$$

The purpose is to determine the number of persons for the various health categories required to provide adequate primary health care.

(a) First define the applicable categories of health personnel required.
(b) Obtain data on incidence of disease and the prevalence of conditions for target community. In absence of data, develop original data from health statisticians, field health workers, and estimates developed by the community.
(c) Identify the appropriate treatment for the diseases and health conditions isolated in the target community.
(d) Obtain data on amount of service time required to treat health problems and the amount of time required in patient care for subgroups of target community.
(e) Analyze data

The data to be collected are difficult to obtain or may be inaccurate, especially that relating to health conditions, e.g., acute, chronic and preventive, the required types of care, the personnel classifications required, and the nature of treatment.

The willingness of the prospective patient to seek services is not considered in the calculation nor is the ability to pay. The result may be overestimation of personnel requirements. However, given the general lack of health personnel in the rural regions, the ability to utilize estimating ranges rather than precise data is the better and more accurate choice. The alternative personnel categories or personnel arrangements which can perform some or all of the same services should be known in order to consider alternatives. The categories of personnel to be used in giving treatment or other service alternatives is important to know in performing the calculation.

Service Target Method. This method centers on the volume of services to be provided to health care users (consumers) as the basic determinant of health personnel requirements.

The necessary data required for the service target method are: population; standards or norms for health service; staffing patterns or task assignments; health personnel producitivity.

Population data are available through the census but should be refined for the target catchment area. The service standard (norms) can be determined from expert opinion or from utilization statistics. Staffing patterns and standards come from staffing studies or task analysis studies. Health personnel productivity is discussed elsewhere in this manual.

The suggested formula is:

$$M_{rt} = \frac{V \times P \times a}{W}$$

where:

$M_{rt}$ = personnel requirements for an occupational category in year t;
V = average number of specific services per person per year per condition, based on need
P = population, current or projected
a = standard for personnel staffing, or proportion of service provided by a health occupation
W = standard productivity of personnel category (e.g., number of home/school visits per year, plus average workload of average practitioner assigned to health facilities as related to both inpatients and outpatients visits.

Example:

a. Assume a target population of 10,000
b. The service target is 48 vaccinations per 100 target persons (0.48) per year
c. Assume that the average village health worker will give an average of 2.125 vaccinations per day
d. The average village health worker works four days a week, 48 weeks in a year or 192 days a year in direct service provision.

$$\frac{10{,}000 \times 0.48}{192 \times 2.125} = \frac{4800}{408} = 11.76$$

Note: Most health workers perform multiple tasks. The estimates of personnel to perform tasks can include the reallocation of tasks to various personnel categories thereby changing the work responsibilities and the nature of service target estimates.

Strengths and Weaknesses. This approach allows the analyst to focus on the provision of services together with measures of their efficient and effective delivery as the central concern. The attempt to build an understanding of relationships among the various factors in this approach is important, especially those factors related to productivity. The analyst can compare the hypothetical utilization of various personnel categories with their productivity and labor costs.

However, the data will not be readily available in all cases and some original data collection may be necessary. Probably some form of task analysis will be part of a health sector analysis. Estimates of productivity can be gathered from providers (using a random sample of providers) who are asked to give retrospective estimates of services rendered over a short span of time. These data can be averaged and a range of high to low can be constructed within plus or minus 10 percent of the mean.

Economic Effective Demand (Budgeted Vacancies Method). This method utilized the financial resources available to pay for health personnel as the primary determinant of demand. Payment can come from the patient, commercial or social insurance, government agencies or other third parties. The availability of the funds to purchase services or underwrite the services is the key factor in this approach.

The required data are:

- Current filled and budgeted vacant positions for each of the selected occupations
- Projected employment or anticipated personnel to be employed in the target year(s). This can include alternatives for various personnel categories
- Hours worked, either part time or full time

Supportive data include:

- Task analysis of job functions
- Wage ranges for job categories
- Length of time jobs are vacant
- Facility characteristics
- Number of beds and inpatient days, average length of stay, outpatient and number of outpatient visits
- Expansion plans for hospitals and other facilities

The Formula:

$M_{rp}$ = Present personnel requirements and

$M_{rt}$ = Future personnel requirements

then:

$$M_{rp} = E_{by} + V_{by}$$

$$M_{rt} = E_{by} - A_{rt}$$

where:

$E_{by}$ = Present or base year employment by category

$V_{by}$ = Present or base year vacancies by category

$A_{rt}$ = Additional personnel need in target year

$V_{by} + A_{rt}$ = Present complement of positions plus personnel needed due to vacancies and expansion

It is assumed that the vacancies represent budgeted job openings for which funds are available. This assumes that current budgets for health personnel are accurate and the assumptions are correct and realistic about future personnel needs. Designated funded vacancies often do not exist in budgets and the focus is on the increase of positions due to expansion, or anticipated increases in personnel remuneration and attendant rise in the costs of their fringe benefits.

This method allows the planner to compare personnel increases by categories based upon the comparative salary rates of personnel needed in the target year. It is important to consider which categories of personnel can perform what task functions and examine the cost comparisons for adding personnel. The most important quantitative and qualitative changes may come from increasing technician and professional time and relying on them to perform more supervision and guidance/ training.

Data for the budgeted vacancy approach come from secondary data sources, especially plans associated with Ministry of Health budgets together with those of training institutions. Original surveys may be necessary to determine some of the data regarding vacancies and expansion. The data sources for such surveys are the employers or providers of primary health care services.

The role of community participation in determining community health prevention and care needs receives insufficient attention in the literature reviewed for the preparation of this manual. There still exists a strong professional bias that the provider knows what is best for the user (consumer). There are a wide variety of uses of health personnel and competing health objectives.

Two issues are important as part of a needs analysis. The first issue is what are the perceived community needs for health care and what forms do the resolution of the need take. Field surveys performed as a part of a health sector assessment and community discussions can elicit perspectives on needs and preferred solutions from various community members.

An alternative to the outside professional performing surveys and imposing his world view on the health needs of the community is to provide the community with the control over the health resources. This decentralized approach to health policy should be considered as a viable and effective approach to health policy planning and implementation. Even though it does not as yet receive adequate attention in the literature.

Environmental Factors

The need to clearly understand the essential components of the environment in assessing and planning health facilities cannot be over-emphasized. An understanding of the total environment provides the planner with elements which must be considered in the assessment of all primary, secondary and tertiary facilities. There are many examples in developing countries of health facilities constructed without adequate consideration of one or several environmental factors. This has resulted in the construction of facilities which are inappropriate in a tropical setting or target area. In assessing and planning of health facilities, the following key factors need to be considered.

Geophysical factors include topography, climate, and man's inpact on the environment. The basic kinds of geographical information on topography, vegetation, terrain, location, water and soil composition (including subsurface and surface conditions, flooding potential, and seismic danger of an area are all valuable to the consultant because other variables (such as climate, architecture and ecology) derive from these data.

Climate results from a combination of effects from natural events. Various elements determine the climatic characteristics of an area. The main climactic elements are: solar radiation and temperature; humidity or aridity; prevailing

winds; and precipitation. Climatic elements interact with each other to produce a set of characteristics particular to an area.

Solar radiation and temperature are interrelated. Both intensity and duration of radiation depends on the movement of the sun; its varying horizontal direction and height (azimuth and elevation) are given according to different latitudes. As solar radiation intensifies, temperature increases. The intensity of solar radiation is determined by the season as well as geographic location (latitude) and time of day.

Temperatures are higher in the afternoon when the sun is in the West because of accumulated heat from the morning and continuing radiation. Temperatures are lowest in the early morning. The daily temperature range approximates the movement of the sun from sunrise to sunset reaching peak temperature in the afternoon and lowest before sunrise. Temperatures can be classified into ranges:

| | | |
|---|---|---|
| a. | cold below 10°C | (below 50°F) |
| b. | cool 10°-15°C | (50°-60°F) |
| c. | mild, moderate or temperate 15°-27° | (60°-80°F) |
| d. | hot 27°-38°C | (80°-100°F) |
| e. | very hot above 38°C | (above 100°F) |

Most developing countries lie within the temperature ranges as defined in c-e above in the tropics and subtropics. In many instances the temperatures in a particular country may, over the course of a day, vary 5° - 10°C. Seasonal variations may be more. The human requirements for comfort and the body mechanisms function best in the 15°-27°C range. Stressful bodily conditions occur in cool and cold as well as hot and very hot temperatures.

Humidity indicates the amount of water vapor present in the air, specifically the ratio between the amount of water suspended in the air and the maximum amount the air can carry at the prevailing temperature and pressure is called relative humidity. The mechanism for bodily temperature regulation is sweating, the release of moisture from skin pores. The release of moisture or the evaporative process is less effective in relative high humidity and can result in a stressful condition.

Relative humidity can be classified into ranges for study in relation to temperatures:

| | | |
|---|---|---|
| a. | very dry (arid) | 0 - 25% |
| b. | dry | 25 - 50% |
| c. | humid | 50 - 75% |
| d. | very humid | 75 - 100% |

The human comfort range is between 22.5°C and 29.5°C (72.5°F - 85°F) at a relative humidity of 20% - 78%.

Prevailing winds produce air movement which is very important in relation to comfort. In humid and very humid conditions, air movement causes the exchange of moisture saturated air with fresh air. This exchange helps to increase the rate of evaporation and is essential in providing relief from high humidity. While in humid conditions, the wind can provide relief; winds that are cold, hot, or dust-laden can also cause discomfort.

Precipitation influences temperature and humidity. Clouds shield direct radiation and reduce temperature. Precipitation also raises problems of protection for buildings and requires provisions for drainage.

The climatic elements, solar radiation and temperature, humidity, prevailing winds and precipitation interact and combine to produce a general climate for a large area. This is commonly referred to as a macroclimate. In building health facilities, the macroclimate needs to be considered; more specific climatic conditions (relative to a smaller area) particularly must be taken into account.

Macroclimate in the tropics and subtropics can be generally categorized into four groups:

| | |
|---|---|
| cool | 10° - 15°C |
| hot, dry | 27° - 38°C, 25%-50% Rel. Humidity |
| hot, humid | 27° - 38°C, 50%-75% Rel. Humidity |
| warm, humid | 20° - 30°C, 50%-75% Rel. Humidity |

Cool temperatures are found in the hilly regions of the tropics. During the day, maximum amount of heat should be captured and conserved for lower night temperatures in order to maintain comfortable conditions. The most appropriate building orientation will be east-west with a minimum exterior surface. Walls and roof should be heavy to absorb and store heat. Air flow and ventilation can be minimized and heating may be necessary.

Hot, dry, conditions in arid areas experience maximum temperatures for 3-4 months and often longer in drought periods. The main consideration is to exclude as much as possible daytime heat and solar radiation. Western exposure should be avoided.

By utilizing materials and construction techniques appropriate to the climatic conditions, internal temperatures can be considerably controlled.

Hot, humid climates are distinguished by relative high humidity (above 50%) and persistent high temperatures most of the year. Daytime temperatures are highest in the afternoon except during winter months. In the summer, day and night temperatures are high with little fluctuation. The high relative humidity, especially during rainy periods, accounts for the need to provide maximum natural ventilation to relieve humidity-caused discomforts. To avoid the high cost of air conditioning, maximum use should be made of prevailing winds. For example, heat/wind turbines can be used. To utilize prevailing winds for ventilation, the microclimate wind patterns must be evaluated. Buildings should be oriented to take full advantage of local wind patterns. The wind direction and velocity depends on the physical features of the surrounding land. Factors affecting wind patterns include shape and contour of the land, vegetation, proximity of other buildings, spacing, and height. All these factors should be considered. Wind scoops to force air below ground prior to coming into the building may be one solution. Note that swamp (evaporative) coolers do not function in humid areas.

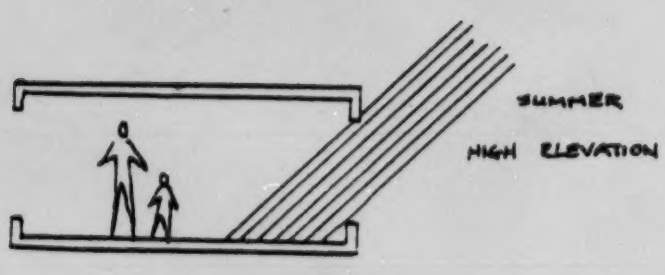
Walls and roof construction in this climate should be light with low thermal capacity. The interior temperatures should be maintained as near as possible to outdoor shade temperatures. Surface finish and color of exterior should be reflective.

Heavy rains are common in this climatic area and they are usually accompanied by strong winds. Wind-driven rain can be excluded from interiors by temporary covers or awnings to protect openings.

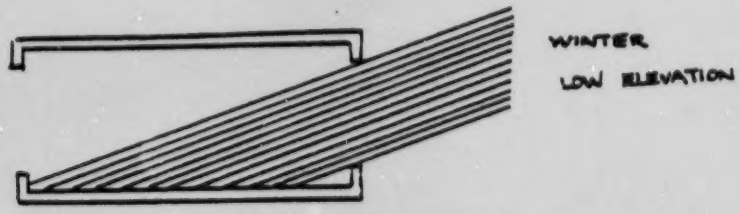
Warm, humid climates are very similar to hot, humid conditions except temperatures are lower. This type of climate is usually found near bodies of water. Advantage can be taken of river or sea breezes. Problems of humidity and rain are similar to hot humid climates and their solutions are also much the same.

Microclimate is another important facilities planning concept. As previously discussed, best use must be made of regional climatic condition (macroclimate) in order to create a comfortable living and working environment. Climatic conditions prevailing in a relative small area (microclimate) must also be taken into account in developing a health facility. Microclimatic conditions will, to a great extent, influence the selection of a building site and the type of construction itself.

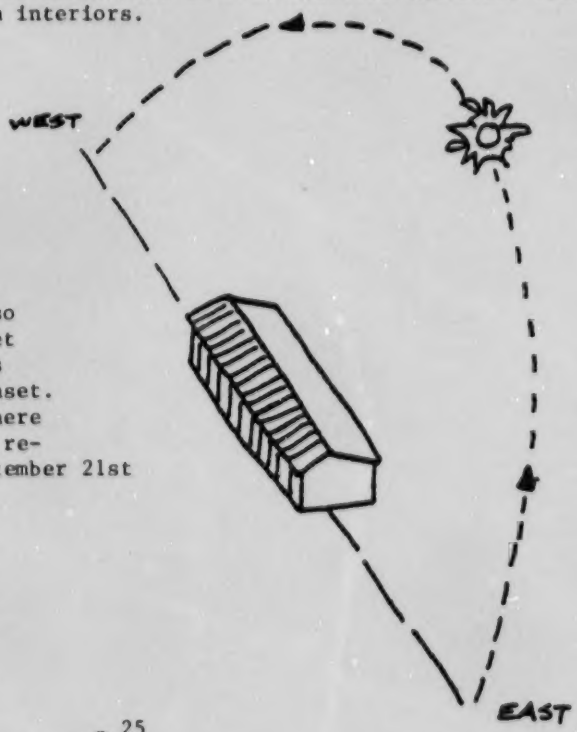
The most severe aspects of the macroclimate and the handicaps specific to the building site should be observed closely.




During summer months, solar elevation is at its peak. Radiation is severe and devices (overhangs, vegetation, shutters) should be employed to shade interiors.

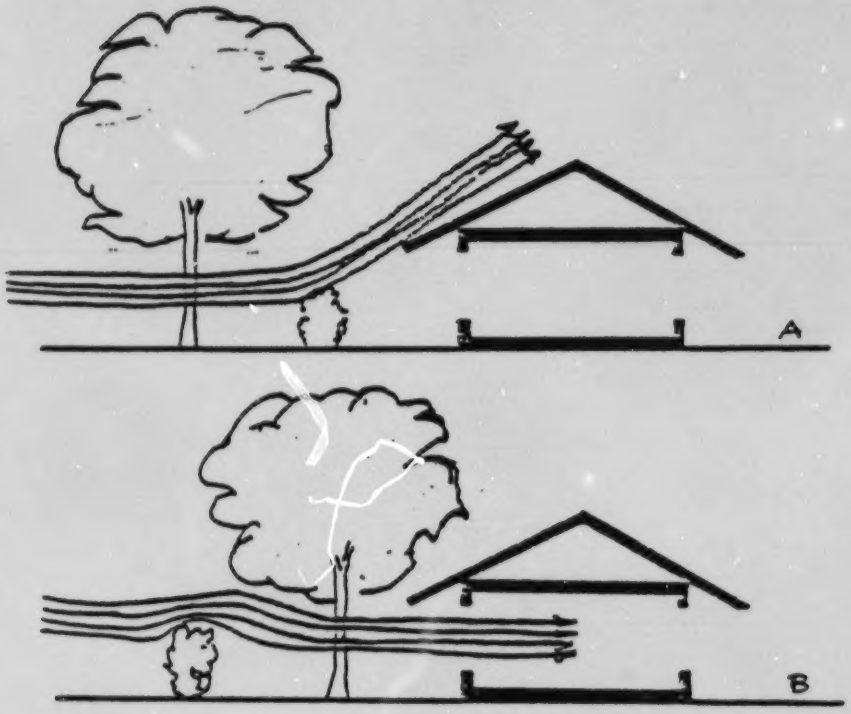



Solar elevation is low in winter and in cool climates the solar radiation can be permitted to help warm interiors.




The solar elevation also changes from sunrise to sunset peaking during the noon hours and lowest at sunrise and sunset.

In the southern hemisphere the south side of a building receives the sun only from September 21st to March 21st.




A. Improper placement of vegetation in relation to building openings. Significant air movement is absorbed or deflected.

B. Optimal positioning of tree and hedge to provide good ventilation.

Proper planting of vegetation or selective clearing will help to direct wind to desired area. Vegetation can control hot winds while transpiration and shading from leaves helps lower temperatures. In high humidity areas low walls may substitute for hedges to deflect wind and provide privacy; berms (mounds of earth) may also be used.

In areas where summer and winter climates vary, deciduous trees have the advantage of providing maximum shade in the summer and permitting maximum solar heating in winter.

To provide a favorable microclimate, a sensitive landscape should include planting and clearing vegetation, paving, orientation and constructing water sources. "By gathering meteorological data and information on comfort requirements, the possibilities and limits of local climate to meet them, the architect will be in a position to design a suitable building to site, orientation, wind directions, ventilation patterns, solar radiation and heat transmission." (Dequeker, Paul. "A Bioclimatic Approach to Tropical Architecture." World Hospital, Vol. XI, No. 2, 3. 1975.)

In summary, well-researched environmental factors for a health facility indicate that the following are characteristics of good site areas:

- Near a center of communication.
- Associated with an organized village; a clear social structure.
- Slightly elevated.
- Well drained.
- Potable water and reliable food sources.
- Good waste disposal, burning and usable sewage treatment area.
- Longer building axis suited to the geographical conditions.
- Near transportation - airstrips, roads, waterways, railroad, etc.
- Access to electricity if possible.

Conversely, it is best to avoid sites that exhibit these characteristics:

- High water table, within one meter of ground surface.
- High potential for flooding.
- Close to existing fly sources.
- Unduly shadowed from the sun by hills.
- Near difficult river crossing or other natural barriers.
- Disputed land or land unacceptable in local culture.
- Hemmed in with hills or inaccessable.

All nations in their quest for higher living standards have made modifications of their natural environment. This often results in the disturbance of ecological balance, alteration of sociocultural values and ultimately some impact on health. Past and potential environmental changes need to be assessed in the planning of health facilities.

Failure to adequately consider environmental consequences during industrialization, urbanization, and growth have resulted in unbalancing sensitive ecosystems. For example, consideration may not have been given to population carrying capacity, optimum land use, and pollution assimilative capacity. Rapid industralization and development with concomitant accelerating population growth should require knowledge and information in order to assess and plan the following:

- Identification of possible technological choices and assessment of impact of each
- Recycling possibilities
- Identification of environmental values
- Raw materials management
- Waste management
- Monitoring for effects
- Sociocultural impact
- Introduction and/or redistribution of diseases
- Occupational health

The attendant problems of urbanization in subject countries need to be considered. These induce high population density, housing shortage, sanitation needs, water supply, nutrition changes, industrial hazards, etc. Consideration should be given to and lessons should be learned from parallel situations in developed countries in similar periods of change and growth.

Explosive population growth in urban areas produces great density and heavy demands on housing and sanitation facilities. Heavy concentrations of people with poor and inadequate accommodations result in conditions that are particularly conducive to the spread of communicable diseases. Moreover, there is a greater chance that new diseases will be introduced.

It is often expected that the economic benefits of urbanization will result in an improvement of general nutritional status. In many instances, the introduction of unfamiliar and new diets may cause deterioration of nutritional balance.

Water sources may be seriously affected by the extra discharge of sewage. Contamination of traditional water sources with sewage and industrial wastes produces great risk of communicable diseases. Pollution of water sources disrupts ecological balance and may be manifested in the breakdown of the food chain.

Industrialization exposes the population, especially workers, to toxic substances and work-related accidents and injuries. This is particularly true in LDC's where there is often little experience in providing for occupational safeguards.

The possible impact of any or all of these potential changes should be considered in planning a health facility for a given area.

Socio-cultural factors are also included among environmental factors. The social environment needs to be evaluated as part of the Field Assessment. To gain a comprehensive understanding of the area under assessment, survey and research should be conducted on the socio-cultural factors that affect health facilities assessment and planning. Some socio-cultural factors which specifically influence the design and construction of health facilities will be addressed in a following section. The emphasis here is to point out the need for the analyst to be sensitive to various cultural factors of the area under study.

Anthropologist Margaret Mead described culture as, "patterns of learned behavior and values which are shared among members of a designated group and are usually transmitted to others of their group through time." Within the context of health there is within each culture a pattern and set of behaviors and values related to health and illness. There exists a set of norms for behavior and beliefs which is represented as a sociological concept of a social institution. Health care as a social utilization is a part of the cultural pattern. It is related to other areas of human activity: religion, education, economics, marriage, etc.

Social institutions have developed methods and set roles congruent with their resources and structures for coping with or responding to disease; moreover, such institutions have developed beliefs, cognitions, and perceptions consistent with their cultural matrix for defining or recognizing disease.

Different societies respond to illness differently and within their own cultural context and perception. Perceptions of being healthy and being well vary.

There is a belief among many Americans and other Westerners that their own culture is superior. A belief in the superiority of one's culture or in the tendency to assess other cultures in terms of one's own experience exclusively is known an ethnocentrism. This is a factor every analyst will have to address. They should be aware of cultural relativism, that values and beliefs of a people are a function of their culture and cannot be understood out of context. Two major facts tend to arise in conducting cross-cultural health assessments: the transfer of cultural expectations, and the belief that Western medicine is correct and should be adopted.

Foreigners often transfer from their own background expectations of how people will behave or ought to behave in certain health situations. It is most important that the analyst develop a sensitivity to and respect for the host culture and thus gain a cultural perspective of other people.

Another important socio-cultural factor is the economic context. Information on the economic base which supports a country and on which local population may be dependent are critically important factors in assessment. Data to be collected include:

- Assessing the source of income.
- Assessing the distribution of income.
- Assessing the extent and role of money vs. barter in the economy.
- Gross National Product - the total value of goods and services produced in a given year.
- Per Capita GNP - gross national product per number of population.
- Major Sources of GNP - the highest income producing aspects of the economy. For example; tourism, agricultural export, industry.
- Levels of Employment - the numbers of persons in the labor force, their distribution according to sectors.
- Future Trends - dams, mills, growth industries.

The need is to understand the local economic base and its trends. Changes in the local economy may produce changes in population, political organizations, imports and exports, etc.

These kinds of data are general to the particular country in question, and regional differences will exist. Moreover, LDC's contain many groups in the population which are outside the main economic sector. Groups such as these may be located in the rural areas and have been generally bypassed in economic research and survey. Consequently, data concerning some rural populations may not be represented in the national data.

It should be noted that some LDC's do not have all the data outlined above. Those described are the general kinds of population data necessary if proper assessment and planning are to take place. The analyst should seek the input of statistical experts which are available from various organizations to which they have access.

Architectural Considerations

The primary consideration in making health facilities available, not unlike housing, is to provide shelters which are economical to both construct as well as operate, and at the same time offer convenient and comfortable living and working conditions. These conditions are affected by climate and its relation to the building. The effectiveness of the various building components in providing comfort is influenced by the materials used and their method of construction. Modern technology in utilizing building materials, equipment and construction techniques, can help to control interior conditions. It is preferable to have buildings adapted to local conditions, materials, available manpower, topography, and climate.

The planner, in addition to considering the architectural requirements for planning and developing a health facility in terms of climate, building materials and techniques, should also concern himself with the medical/social-cultural needs of the people who will be using the facility. Only with some understanding of the users can a facility be planned and built which will be functional and satisfying both psychologically and sociologically. If this does not occur, a very fine, expensive structure may be built, but it will be used, if at all, by very few people.

Building Materials

Local materials when available should be utilized for economic reasons since they will not usually require specialized skills but permit the use of local labor.

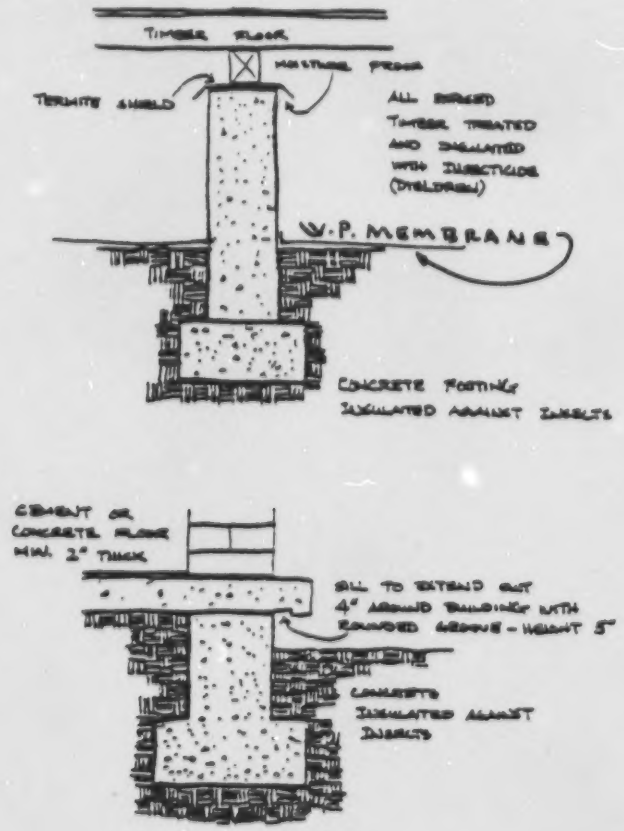
Figure 7 on the following page (Source: Dequeker, 1975) indicates heat transmission in some roof coverings used in the tropics. Thermal characteristics of various materials are described. While interpreting the information contained in Figure 7 it is important to note that the data is based on seasonal high temperatures of from 27°-33°C (80° - 90°F).

In regions where suitable materials are not available, or where there is insufficient skilled labor, the prefabrication of building elements, while expensive, could be used. By adapting prefabricated building elements that are easily transported, normal building construction may be expedited. The use of prefabricated elements may reduce the construction time for projects with a great many similar units.

The disadvantages of prefabricated construction are the high cost of manufacture as well as transportation. In construction it is preferable that inexpensive local resources be utilized except in some situations such as disasters when other building materials may have to be brought in.

When constructing health facilities with limited resources the problems of asepsis and maintenance should be considered. Tight fitting joints are required. For obvious reasons maintenance costs may be kept to a minimum by the careful selection of materials and finishes.

In tropical climates the presence of insects such as mosquitoes, termites and flies presents problems in buildings. Pests should be exlcuded from buildings. Where feasible, screens are employed as protection against flies and other flying insects. Protection against termites may be provided by chemical treatment of woods plus the use of termite shields as illustrated below.



## HEAT TRANSMISSION OF ROOF COVERING MATERIALS IN THE HUMID TROPICS

| TYPE COVER | INSULATION: no ceiling | sheet aluminum | 2.5cm fiberglass | 7.5cm coat cement | ceiling to purlins: 13mm fiberboard | 4.5mm asbestos cement | ceiling to tie rod: 13mm fiberboard | 4.5mm asbestos cement | Heat thru ceiling | Temp. inc.of ceiling | Appraisal |
|---|---|---|---|---|---|---|---|---|---|---|---|
| corrugated | | X | X | | X | | | | 10.0 | 1.8 | |
| planks in | | X | X | | | X | | | 11.7 | 2.1 | |
| asbestos | | X | | | X | | | | 18.5 | 3.3 | |
| cement on | | | | | | | X | | 20.6 | 3.9 | |
| purlins in | | | | | X | | | | 25.2 | 4.1 | |
| wood; ven- | | X | | | | | X | | 25.2 | 4.4 | GOOD |
| eer paint- | | | | | | | | X | 34.2 | 6.3 | |
| ed white | | | | | | X | | | 38.0 | 6.9 | INSUFF- |
| | X | | | | | | | | 76.0 | 13.3 | ICIENT |
| corrugated | | X | X | | X | | | | 21.7 | 3.6 | |
| planks in | | X | X | | | X | | | 25.2 | 4.4 | GOOD |
| asbestos | | X | | | X | | | | 39.6 | 7.0 | |
| cement, | | | | | | | X | | 45.0 | 8.4 | |
| dark wood | | | | | X | | | | 53.7 | 9.4 | |
| plank pur- | | X | | | | X | | | 54.0 | 9.5 | INSUFF- |
| lins (ven- | | | | | | | | X | 72.0 | 13.6 | ICIENT |
| eered) | | | | | | X | | | 80.9 | 14.7 | |
| | X | | | | | | | | 160.1 | 28.2 | |
| corrugated, | | | | | | | X | | 12.0 | 2.3 | |
| galv.sht. | | X | | | X | | | | 13.8 | 2.5 | |
| mtl. on wd. | | | | | | | | X | 17.9 | 3.1 | |
| purlins ptd. | | X | | | | X | | | 19.8 | 3.4 | GOOD |
| white | X | | | | | | | | 69.5 | 11.9 | INSUFF. |
| corr.galv. | | | | | | | X | | 35.8 | 7.3 | |
| sht.mtl.on | | X | | | X | | | | 41.2 | 7.4 | |
| purlins in | | | | | | | | X | 54.0 | 9.5 | INSUFF. |
| mildewed wd, | | X | | | | X | | | 59.4 | 10.3 | |
| ptd. red. | X | | | | | | | | 207.0 | 36.0 | |
| corr.alum. | | | | | X | | | | 13.8 | 2.5 | |
| on purlins, | | | | | | X | | | 19.0 | 3.3 | GOOD |
| wd.,planks | X | | | | | | | | 68.9 | 11.7 | INSUFF. |
| corr.alum., | | | | | X | | | | 19.3 | 3.4 | GOOD |
| wd.purlins, | | | | | | X | | | 26.9 | 4.7 | |
| planks und- | X | | | | | | | | 96.6 | 16.7 | INSUFF. |
| er dust | | | | | | | | | | | |
| concrete | | | | X | X | | | | 19.5 | 3.4 | GOOD |
| slab,10cm | | | | X | | | | | 43.7 | 7.6 | |
| ptd.white | X | | | | | | | | 58.9 | 10.3 | INSUFF. |
| concrete | | | | X | X | | | | 41.5 | 7.4 | |
| slab,10cm | | | | X | | | | | 96.3 | 16.2 | INSUFF. |
| ptd.dark | X | | | | | | | | 125.9 | 22.1 | |

Developing Prototypes of Health Facilities.

In order to establish a network of rural health services in most LDC's, it is essential that both communications and transportation be provided at the adequately staffed HC/Hs so that they are able to maintain constant contact with the HPs (to be staffed only by auxiliaries) under their jurisdiction . . . and transportation should enable teams from the HC/Hs to visit their HPs regularly, that is on a scheduled basis. This has proved not only more economically feasible but far more effective use of scarce and expensive trained health manpower, and at the same time raises the level of professional "integrated" practices.

In order to both facilitate and expedite the establishment of a network for an "Integrated Rural Health Delivery System" (RHDS) it has been found practical to develop prototypes of rural health facilities designed to accommodate functions, staff and equipment as well as volume of services anticipated for a given regional rural population from 20,000 to 100,000. Based on established criteria there follows an example of how this may be done for the HC/H with from 20 to 60 beds.

Depending on accessibility, transportation, and the number of supporting intermediate and small health posts referring patients, the following calculations for the combined Health Center/60-bed Hospital have been made to serve a population from 60,000 to 100,000. Out of this population from 2,000 to 3,000 in-patients would be served annually depending on the above factors. This is appropriate for an LDC region of the size stipulated provided that only those patients whose clinical condition justifies hospitalization are admitted; all others should

| | AVERAGE NUMBER OF OUT-PATIENTS DAILY | | AVERAGE NUMBER OF IN-PATIENTS DAILY | |
|---|---|---|---|---|
| | New | Old | Admitted and Discharged | Census |
| Health Center-Hosp. with 20 beds | 15 | 100 | 3 | 17 |
| Health Center-Hosp. with 40 beds | 30 | 200 | 6 | 34 |
| Health Center-Hosp. with 60 beds | 45 | 300 | 9 | 55 |

be retained as out-patients. No provisions are made in these calculations for long-term or chronic care, hostels, etc. About 230 work-days per year are calculated, with an assumed 9 in-patients admitted and discharged daily. In addition, during these 230 work-days, there will be an estimated 300+ visits made daily by approximately 100 out-patients; resulting in about 70,000 visits (lab., x-ray, dental, physical exams., minor surgery, etc.) by some 23,000 out-patients annually.

Health Post - Intermediate: Plans for this prototype physical plant facility are based on an assumed daily number of patients, each accompanied by 3 family members or friends. 50-60 out-patients to visit the health post-intermediate daily; of which 7-10 are new patients requiring registration, the balance are old out-patients returning for follow-up.

Health Post - Small: Plans for this prototype physical plant facility are based on an assumed daily number of patients, each accompanied by 3 family members or friends. 20-25 out-patients to visit the health post-small daily; of which 3-5 are new patients requiring registration, the balance are old out-patients returning for follow-up.

Provided in Appendix C., Item 4. "Architectural Factors" are examples of work sheets showing how capital investment costs for these two types of facilities may be determined. A preliminary drawing of a prototype rural HP-S is also provided with the above mentioned work sheets.

The relation of transportation and communication to the efficacy of the health network in any rural area cannot be stressed too strongly. It is essential that the auxiliaries at the HPs should be able to communicate with a physician at a HC/H at any time; the physician can advise, based on the symptoms described: (1) if the auxiliary should proceed with treating the patient and how; or, (2) if the patient can be told to return when a physician and his team will next visit that HP; or, (3) if, for example, the question is one of elective surgery, where to refer the patient; or, (4) can transportation be sent from the HC/H to the HP to bring the patient in . . . and all of this is usually referred to as "disposition."

The "Relation of Capital Investment . . . "chart that follows is designed to show how a summary of the cost estimates may be made for the various prototypes. It is essential to complete the "Annual Cost of Operations" columns on the above named chart in order that the ratio of annual recurring costs be established to the initial capital investment in order to facilitate decision making regarding feasibility.

Social and Cultural Considerations.

The design and construction of health facilities should be approached with objectivity, and be as free as possible from preconceived notions of past design solutions. Traditional local patterns of health care which are valid should be encouraged and provided for. No less important is the utilization of local architecture as a guide to designers in overcoming the difficulties arising from harsh and unusual climatic conditions.

The design solution for a facility should be appropriate to the surroundings. Facility users should feel welcome and accommodated. Spatial arrangements and furnishings help to accommodate users' lifestyles to a great extent. For example, in many cultures a patient visiting a health facility is usually accompanied by two or three persons who assist (or sometimes hinder) patient care thus provisions need to be made to accommodate them.

The program and design of a facility will take into account the need for versatility in view of the uncertainty with respect to the future of health programs. Developing countries have dynamic societies. Their socio-economic conditions are unstable and many are in various stages of urbanization and industrialization. The requirements for health services, in quantity and quality, are changing rapidly. Therefore, health facilities should adapt easily to changing requirements.

Traditionally, government or nongovernment agencies providing health facilities tend to develop health programs (and plan buildings to accommodate them) without involving adequately both consumers and providers. Involving these parties will help assure that any health facility being planned provides for functions beyond the delivery of customary health services. For example, the facility should serve the community as a focal point for developing good personal hygiene and sanitary practices. In addition, it should provide jobs and training during construction as well as later on in the day-to-day operation of the facility.

The recurrent theme in developing countries is the need for the construction of inexpensive health facilities. It is especially important to develop the most economical construction system possible. Long-term economy of operation, including maintenance, together with immediate savings in building, merit the utmost attention during the program and design stages.

Early involvement of the community through carefully worked out arrangements will form a good basis for future cooperation between staff and patients. This kind of close working together will be essential in rural health facilities as the emphasis changes from curative services to comprehensive community health that includes stressing prevention.

RELATION OF CAPITAL INVESTMENT IN VARIOUS TYPES OF NEW HEALTH FACILITIES (TO BE CONSTRUCTED AND EQUIPPED) TO THEIR ANNUAL COST OF OPERATION -ESTIMATES AS OF ____ FOR DEMONSTRATION MODELS OF AN INTEGRATED (PREVENTIVE, CURATIVE AND ENVIRONMENTAL) HEALTH DELIVERY SYSTEM

| (1) Population served | (2) Type of Facility | (3) Capital Invest.in Physical Plant: Structure, inc.mech. installation | (4) Fixed Equip. | (5) Movable Equip. | (6) Annual Cost of Operations: Personnel Salaries | (7) Expend-able Supplies | (8) Other | (9) TOTALS cols. 3,4,5 | (10) cols. 6.7.8 | (11) |
|---|---|---|---|---|---|---|---|---|---|---|
| 20,000 to 40,000 | Health Cent. Hospital avg. cost | | | | | | | | | |
| 20-40,000 | A. 25 beds | | | | | | | | | |
| 40-60,000 | B. 40 beds | | | | | | | | | |
| 60-100,000 | C. 60 beds | | | | | | | | | |
| 3,000 to 12,000 | Intermediate Health Post (no in-patients, only observa-tion) | | | | | | | | | |
| 1,000 to 5,000 (average 3,000) | Small Health Post (no in-patients) | | | | | | | | | |

N.B.: Column (10) is only the total of the estimated cost for the first year of operation ( ).
Column (11) indicates factors for 25 years depreciation for column (3); 5 years for cols. (4) and (5).
Figures include 10% inflation factor over current estimated costs.

To gain a more precise picture of health expenditures the analyst will need specific data on several factors.

Total Health Expenditures by Government: This is the budgeted amount for all health services including expenses for nutrition, health education, environmental health and other public health programs as distinct from expenses for district health care. The allocation of funds within the last 5-10 years and future projections should both be noted. Especially useful will be a breakdown of allocations by region (rural, urban), categories (training, salaries, administration, construction, maintenance, etc.) Calculation of the percent of government budget for health can be derived along with contributions to health through social insurance, employment compensation and others.

Public Expenditures from International Sources: International contributions may influence the nature and level of health related expenditures. Data on grants and aid projects should be gathered showing regional focus and the duration of such expenditures. UNICEF, WHO (through its regional offices), FAO, World Bank, U.S. AID, together with international and national contributors are some of the donor organizations involved in this area.

Private Sector Expenditures: The allocation of funds from the private sector include religious agencies, insurance and private health practices. Projections across time and by region should be noted.

From the above, the analyst should be able to derive data on expenditures marked for health facilities construction and operation. The role that health facilities play in terms of national health objectives will thus become evident, thereby influencing the later planning stages and perhapd lead to health services reform.

EXPENDITURES PLANNING DEVICE

| Resources Needed | When Needed | Cost |
|---|---|---|
| A. Operating Expenses | | |
| 1. People needed | | |
| Professionals | | |
| Full-time | | |
| Part-time | | |
| Non professionals | | |
| Full-time | | |
| Part-time | | |
| 2. Materials and supplies | | |
| 3. Other operating expenses such as maintenance, repair, and depreciation | | |
| B. Capital Expenditures | | |
| 1. Buildings | | |
| 2. Major equipment | | |
| 3. Vehicles | | |
| (This classification would be modified in each particular program depending on needs and available resources) | | |

*Source: Adapted from Liberakis, Argyris. "Four Models and Their Priorities under Restricted Environmental Resources for Health Care." World Hospitals, Vol. XI, Nos. 2, 3. 1975.

Financial Resources.

Few governments in LDC's have clearly defined objectives for increasing health expenditures proportionately. The administrative framework for setting health policy decisions is usually poor and politically influenced; the question is, "To what extent?" Moreover, an adequate data base on which to allocate, evaluate and monitor health expenditures is frequently lacking.

Government expenditures on health in LDC's seldom exceed 2% of GNP. This small sum partially explains the coverage of only a small percentage of the population. As health systems have evolved (with little or no planning) countries have placed heavy emphasis on high cost, individual, curative medicine as opposed to preventive measures and maintenance of positive health. Limited government health funds have gone in general, toward specialized care in over-equipped hospitals, staffed by expensively trained personnel. Usually the major portion of funds are committed to urban areas, while population in the rural countryside and city slums remain beyond significant health coverage.

Private expenditures for health may be larger than those of the public sector but both are focused on curative care. Preventive care and early treatment measures are often largely neglected. Government sanctions of this practice are revealed by the support given to constructing, equipping, and staffing for curative facilities . . . which, more often than not, have inadequate operating budgets to enable them to be cost-effective as well as "health" effective.

Existing Facilities/Services.

The citizens of the subject countries may receive some of their health services in facilities such as:

| | |
|---|---|
| Tertiary Facilities | - refers to hospitals and other inpatient specialized facilities affiliated with Medical schools; out-patient units located in urban areas that provide primary care. |
| Secondary Facilities | - refers to general hospital (not "special") usually located in urban areas and sometimes serving an adjacent rural region. |
| Primary Facilities | - refers to ambulatory facilities to be used for diagnoses/treatment and screening for those needing selective referral for hospitalization located in both urban or rural areas. |
| Facilities Housed in Mobile Units | - refers to movable health facilities providing specialty or general ambulatory care. |

In order to assess existant health facilities and determine the services which are being delivered, it is necessary to have a knowledge of the total environment. Health facilities and services should never be viewed in a vacuum. In carrying out such an analysis, the facilities are to be viewed in the environmental setting in which they operate; emphasis is to be placed on the people served, their feelings and beliefs, in addition, the length of in-patient stay, out-patient visits, and comparison of cost are also investigated.

Approaches to Field Research.

It is essential that the field assessment take into account many aspects of research design. Several checklists and/or assessments forms are provided in the appendix of this manual which should be of value in deciding on data collection; considering this material should also be helpful when selecting members of the field investigation team. Each team should have a member who is well versed in statistics.

During the preliminary assessment phase the team should decide which of the checklists, or modification thereof, will be used in its particular survey, and how each will be used. At this point, a data analysis program should be formulated, recognizing that the final data collection instruments and the data analysis program are intricately related. The instruments are designed to assure that all significant items necessary for the assessment are considered. In this way omitting important issues is avoided. Many decisions made at this point will facilitate both collecting and utilizing the required data.

One of the decisions which should be made is whether or not a sampling procedure should be used and, if so, what type. The following are some basic definitions of and concepts pertaining to sampling.

A population is a group of persons, objects, or items having certain characteristics. All of the residents of a given geographical area, all the health facilities in a region, all medical records, total number of patient days, visits, or the utilization rate of a particular rural area, are examples of what is meant by "population."

By specifying rural primary health facilities, as an example, a sub-population can be extracted from the total population. This example is what is meant by a sub-population or stratum -- dividing a country into distinct regions or province categories. With a specific criteria as the basis of a sub-population/stratum, additional sub-groups can be increased depending on the number of variables to be considered (such as ethnic origin, income, age, sex, etc.).

A sample can be viewed as one slice of a very large pie. This one slice should be representative of the whole population containing all of the compository styles and characteristics of the total population in the same proportions.

The overall value of the sample is its ability to provide judgments on the total population. The sample is more practical and economical to work with in attempting to gather or obtain information on a large number of people or area. Generally, there are two types of samples: the probability sample and the non-probability sample. The difference between the two is that the probability sample will spell out each element (the probability or chance it will be selected) whereas in the non-probability sample, it is impossible to estimate probability or chance regarding the selection.

Probability Samples.

(1) Simple Random Samples: Random Sampling is the most popular basic probability sampling design in use. This method of selection gives every item in the population a chance to be selected. After each item has been numbered, the sample is selected with the use of a table of random numbers so as to assure that the same amount of weight is being placed on all variables.

(2) Systematic Sampling: There are some cases where the analyst in the field is confronted with an exceptionally large population. When this occurs, one possible sampling approach is to use systematic sampling with a random start. If an analyst needs to evaluate several thousand medical records, he can establish the size sample he wants, determine its percentage of the population, then use that percentage (such as "every tenth record") as the basis for the selection interval. Whatever the selection interval, it must be consistent throughout the selection procedure.

(3) Stratified Random Sampling: To guard against inadequate or unbalanced collection of data, the stratified random sampling technique divides the population into subgroups according to specific criteria or characteristics. Random sampling from the subgroups then gives guaranteed coverage of the targeted group.

(4) Cluster Sampling: This procedure is another example of probability sampling. When money and time prohibit random sampling, research can specify what constitutes a cluster. Once the clusters are established, the subjects are selected through random sampling methods.

Non-Probability Methods.

Most research workers reserve the term "sample" for randomly selected observational units, such as those described in Section 3.a. above. While probability samples are always the preferred method, in practical situations it may be impossible to employ true sampling, so that some "grab group" of available observations may be the only possible basis for assessing facilities. The logical problems involved are clear; if the observed units are systematically different, perhaps in an unknown way, from the population under consideration, conclusions and recommendations from non-probability "samples" may be in error. Yet since some assessment must be made, it is more advantageous for the team to examine a "grab group" than for it to attemt to make decisions in the absence of empirical data. Non-probability methods amount to observing a supposedly representative collection of members of the universe of interest. In this situation, the investigator should seek to include a wide range of the phenomena being studied, and should be aware of any identifiable ways in which the observations are likely to be biased away from values typical of the universe. Facilities near good roads, for example, may have very different characteristics than more remote facilities, so that if only easily accessible sites are visited, the resulting nonprobabilistic data may misrepresent the values for the area, province, region, or country.

Survey Methods.

As may be seen by considering the various types of samples, many different kinds of data can be collected. Consequently, several different approaches or methods may be used. Basically, most data will be acquired by survey approaches using one or more of several methods: interviews, questionnaires, rating scales, observations, and discussions.

Although the survey does present some problems in the area of reliability and validity of responses, it cannot be overlooked as a tool for conducting a field assessment. In order to increase reliability and validity, a combination of various research methods might be used.

Survey techniques, like any other research approach, must be well planned in advance. The objectives, length of time, costs, and other factors pertaining to the feasibility must be taken into account when planning the survey.

Regardless of whether it is decided to use the interview method or the questionnaire method, they both should be well planned and written so that each team member is using the same instrument and receiving more or less the same types of materials or data. This will help to increase the reliability and validity of the results.

With the interview and/or the questionnaire, the questions can be close-ended or open-ended. Each has its advantages and disadvantages. The closed-ended type question is similar to objective type or multiple-choice examinations. All questions asked provide a choice of answers from which the respondent must choose. For example, the interviewee may be asked "Have you ever been treated at such-and-such a health center?" The response choices given are "yes" or "no." The closed-ended question forces a choice.

The open-ended question is roughly equivalent to an essay type examination. The same or similar questions are posed in such a way that the respondent can answer the questions in his/her own words. This approach gives more latitude for answers but the responses are more difficult to tabulate. Though with the close-ended questions there is better standardization, certain data areas may be overlooked simply because of the questions touch on the subject.

When interviewing a rural or peasant population, there are several considerations which can be recommended by those with extensive field experience in data gathering (Ingersoll, 1976). These include:

Entry. If the interview is not simply an academic pursuit of knowledge but project centered, the participant will have a much greater incentive to participate. Factors to consider in planning the interview include: cultural values, the influence of the extended family, language comprehension, outsiders sitting in on the interview, and differences in perceptions of space, time, and quantity.

Respondent in Center. Make the respondent the center of attention during the interview. Be sensitive to participants who need cues to continue. Pay attention to answers. Don't divert attention to the mechanics of filling out forms.

The Interviewer's Posture. The ideal is neutrality, although it may be necessary to be positive to the respondent's views in order for the interview to proceed. Receive all replies with interest. Avoid such body gestures as nodding, foot-tapping, or arms crossed on chest or akimbo. Engage in active listening, e.g., repeating exactly what the person says. Decide how to handle confusion over a question, e.g., rephrasing a question or giving an example. Note any further probes into a question for inclusion in the report of the interview.

Departure. Make sure that the respondent is not left with false impressions, e.g., that a new health facility will be built as an immediate result of his participation. Give some praise if new information and ideas have been volunteered. Signal the end of the formal interview, e.g., closing up the clipboard. Observe the social amenities upon departure, e.g., small talk. One may have to come back with more questions.

Another survey method is the use of rating scales. These are used to quantify factors which may be highly subjective or qualitative in nature. There are basically four types of rating scales:

- Nominal Scales: These simply categorize different factors into a dichotomy.
- Ordinal Scales: These are used for ranking the order of items or objects along a continuum.
- Interval Scales: These rank order items along with the degree of difference between the items.
- Ratio Scales: These are interval scales with a natural zero point.

Multiple Criteria Utility Assessment is another systematic procedure for surveying complex alternatives. This method could be especially useful in the Evaluation and Planning section of the Preliminary Assessment. Utility assessment provides a common scale for combining judgments on more than one dimension. The method is used to:

- Evaluate alternatives using more than one criterion.
- Combine effectiveness measures into a single aggregated utility, e.g., as in cost-effectiveness analysis.
- Determine a common criterion for valuing the possible outcomes in a decision under risk.
- Provide a common measure for comparing the performance of alternative plans (e.g., Contingency Analysis).

Three key definitions in this method are:

- "Utility" is a quantitative expression of the worth or satisfaction associated with an outcome.
- A "utility function" associates the possible levels a criterion may take with the utilities for those levels.
- A utility "matrix" presents the elements of a decision certainty: alternatives, criteria for evaluating the alternatives, weights indicating the relative importance of the criteria, and the assessed utilities.

In order to compare and evaluate various alternatives (A, B, . . .), several criteria ($x_1$, $x_2$ . . .) are first specified. The decision maker or respondent considers each criteria separately, assessing the relative utility for different criterion levels. The criteria are weighted to represent their relative importance

to the decision maker. The aggregate utility for each alternative is determined by computing the weighted sum of the individual utilities for each criterion. Alternatives are compared on the basis of overall utilities.

Finally, observation and discussion, while not contributing directly in terms of gathering and analyzing quantifiable or standardized information, are useful techniques particular in developing the instruments for the interview and/or questionnaire. Through observation and discussions, the person developing the instruments should be able to broaden his coverage of information.

Obviously, space does not permit a lengthy treatment of survey methods here; analysts needing upgrading of their skills in these areas are advised to consult local research institutions and/or additional specialized texts.

Observations based upon random samples will provide current and realistic estimates of quantifiable and qualitative characteristics of health care systems. Sample value are logically preferable to estimates calculated from formulae, conjectured by experts, derived from data for previous years, or otherwise obtained by non-sampling procedures. Data obtained from direct observation, but not based upon random sampling methods, are better than nothing but generally present serious problems of interpretation; the investigator must consider how and to what degree non-random observations deviate from the population values required for assessment purposes.

For many practical situations, samples should be "stratified" according to relevant characteristics of the population, to insure that subgroups of interest are adequately represented. The methods of analysis must reflect the sampling plan. Field staff, as noted earlier, must adhere to uniform procedures at data collection sites for the assessment to produce a valid description of health facilities and needs.

Pilot Study.

After initial assessment has indicated that a field study is necessary, and after the objectives of the project have been set, techniques decided upon, instruments developed, and team members selected, it is time to test out the entire procedure in a pilot study. The pilot study should capsulize the entire project from beginning to end.

The members of a team would actually go into the field, after selecting a target area. They will go through the entire procedure as if they were actually performing in the larger project. The pilot study will yield several things:

- problems in communication;
- problems in transportation
- accessibility of people, records, or services, whatever the target group;
- whether items in the interview or on the questionnaire are clear and yield the intended information;
- whether the items are comprehensive;
- whether there are climatic factors which hampered the work (team members' feelings and reactions);
- team members can report any personal (health) problems they might experience:
- discussion and observation techniques by team members in addition to the structured techniques should yield additional information which may not have been considered
- any cultural elements which posed a problem (religious rites or customs for example);
- response of officials of the host country.

After some decisions have been made on the team composition, the data collection instruments, and the data analysis program, there are several other considerations which must be taken into account. One must determine which sampling technique to use, the size of the sample, analysis and presentation

of the data and the cost of the entire procedure. For example, one must determine the approximate/exact size of the population and then select a sample size that will represent the population. It may be decided also, for instance, that: area sampling of disease would be adequate; or it is the most economical depending on how important these factors are to the assessment and/or planning of the health facilities.

The target groups may be people, services, or facilities, depending on the type of input necessary for the assessment. These groups are defined by the charactertistics set by the assessment team and the findings of the preliminary assessment. The purpose of surveying a particular target group is to obtain the necessary data which would provide information on existing needs and resources. Some target groups are:

- ethnic groups
- disease area (patterns)
- manpower/training/training facilities
- population-communities
- financial resources
- health facilities
- users of health providers and facilities
- environmental factors
- site selection
- architectural factors
- supplies and equipment.

It is possible that the target group that has been defined and selected in the preliminary assessment may be non-existent, or if it exists, not accessible. In that case, an alternative should be developed and implemented. If there is not enough information under one alternative, another strategy should be developed.

After the pilot study has been conducted and its results analyzed, procedures for implementing the full field assessment can be developed. Since these will always be very site-specific and extremely variable based on local conditions, no attempt will be made here to model such procedures for the analyst. At this point in the health sector analysis process, it should be clear to the analyst what data are needed in order to carry out an adequate field assessment.

## CHAPTER FOUR

## PLANNING

The classic planning model assumes the rationality of decisions and adapts its methods, strategies, and content of planning to yield more rational public policies. The approach has been questioned by health planning theorists in the West, primarily because of the limits to planning and evaluating goals and values. The multi-variate nature of variables and cause/effect relationships limits truly informed comprehensive planning. This question has led to variations in planning strategies. This includes:

Probabilistic Programming: This strategy recognizes incremental multi-centered decision processes and seeks to expand the probabilities that decisions will be made more rationally. The use of major information systems to provide better knowledge and facts, and therefore better predication, is advocated.

Informal Coordinator-Catalyst: This strategy places the planner in the crossfire of conflicting public issues. Consequently the planner seeks solutions based on compromises and informed judgments.

Disjointed Incrementalism: The limits to comprehensive planning encourages the strategy of segmental and incremental policy recommendations as problems arise. Analysts in this approach will be partial. The vague externalities and spillover effects are not examined.

Advocacy and Plural Planning: This strategy assumes that there is a tension between personal convictions and supposedly value-free professionalism. Since few public decisions are of free value choice, the planners are assumed to be acting partially from their convictions. This strategy suggests that planners work with community groups, the poor, rural areas, and neighborhoods to address problems.

Adaptive and Contingency Planning: Adaptive planning is seen as a major alternative to developmental planning which in turn seeks to generate full utilization of hitherto unused resources. Adaptive planning is interested in qualitative adaptations. These adaptive plans respond to the forces and pressures of a country's developmental decision-making.

In view of the importance of each of the above strategies used to obtain the overall best results for an LDC, the approach of this manual is to synthesize and integrate these strategies as much as is possible. Analysts recognize that while many useful techniques have been developed for conducting field assessments and gathering data, the methodologies for planning still remain highly dynamic and subject to local objective and choice.

This document discusses two aspects of planning that help to put the required task into perspective for the analyst. First, long-range planning is addressed so that analysts can derive policy recommendations for their superiors based upon the preliminary and field analyses. Second, operations planning is outlined so that the analyst will have some input on how to implement a development plan in the area of health facilities. Finally, a few brief comments are

offered on evaluation of planning in the interest of promoting the concept that planning is an on-going dynamic process and as such each analyst will want to evaluate and upgrade not only the content of the plan on a regular basis, but the process of planning itself. References are provided in the appendix for further input.

Long Range Planning

Regardless of the country and the quality or quantity of data collected in the preliminary and field assessments, all analysts will at some time be called upon by the nation's top decision-makers to provide policy recommendations based upon their work. These requests often come before any formal plan is developed. This need not upset the analyst unduly, if the basic nature of the decisions that such top authorities must make is understood. Only with this perspective will the analyst produce information that can be effectively used; and then, only by speaking the language of the top decision-makers will the staff input offered be adequately considered and acted upon.

Within the context of making difficult decisions on how an LDC will utilize its resources, decision-makers must work in an environment of scarcity. Scarcity (especially money) creates competition for limited resources. Since the health facilities planning analyst is competing, in this sense, with every other planner offering advice to top decision-makers, it is essential to recognize the basic questions that must be answered in order to allocate scarce resources. The following are three basic questions to be asked.

(1) What kinds of facilities will we need; what will they cost to construct, equip, and operate; when can they be built? (FACILITY)
(2) Where should those facilities be placed? (LOCALE)
(3) Who will use these facilities? (UTILIZATION)

The current health status of a country is described by region, by disease, and by population from the data gathered under the preliminary and field assessments. Though there are great similarities from country to country, answers in a long range sense to the above three questions must necessarily be site specific. This manual, therefore, is unable to provide specific answers to these questions in any detailed way. However, certain principles that are present when dealing with planning in developing countries are discussed below and, where suitable, should be considered in any long range plan. (Gratitude is expressed to Dr. Paul Zukin of Kaiser International in Oakland, California, U.S.A. for his input on the formulation of these principles.)

The following are the suggested principles that might guide analysts in providing input to policymakers around the issue of what kinds of facilities will be needed, what they will cost, and when they can be built.

a. Integration of Services: The primary health care system as promulgated through its facilities should be based upon the complete integration of clinical (curative) medicine with preventive/promotive services.

b. Peripheral Care: Recognizing that it is impossible to provide a health post within reasonable access to all citizens, the primary health care system must offer more peripheral services that reach out beyond the health post. Two approaches have been successful: the training of village-level health workers to operate out of "village dispensaries" and mobile or satellite clinics operating out of health posts or centers. Primary facilities should be designed to support these outreach services to villages, schools, and homes. This calls for smaller facilities more widely dispersed and increased use of vehicles and communications systems.

c. Standard Design Elements: Design elements should be developed that will be standard throughout the health care system, i.e., they will be the same for

health posts, health centers, and hospitals. This approach provides flexibility and ease of expansion, reduces cost due to standardization of space elements and equipment, offers felxibility in adjusting each facility to local site conditions, and makes it possible to involve local participation in final planning and in locating the proper site for the new facility.

d. Level of Care: It should be understood that the level of care planned for new facilities will not necessarily be typical of the past, nor will it be considered ideal of the future. Rather, the facilities will be planner to be as desirable as possible within the constraints of what is attainable today . . . Flexibility, as indicated earlier, is the key word.

e. Materials, Labor and Maintenance: It is understood that good policy dictates that wherever possible local building materials be used to reduce costs and promote self-sufficiency, that facilities will be designed for the use of communal labor wherever feasible, and further that they will be designed for easy and low-cost maintenance.

The following are the suggested principles that might guide analysts in providing input to policy makers around the issue of where facilities should be placed.

a. Low-Cost Facilities for Greater Coverage: The central theme of primary health care facility planning is to deliver health services to as many people as possible at the lowest possible cost. Therefore, the accent should be on more facilities at less cost, outreach programs, and preventive and promotive services. Increased coverage will be obtained by building greater numbers of small facilities rather than few numbers of large facilities.

b. Visibility and Access: In support of the above theme, public health services should occupy a more prominent role in the community and be physically located in a more visible and accessible position within each community and/or facility.

c. Consumer Orientation: All facilities planning should be "consumer-oriented" so that it focuses on services to family units or individuals. Planning should be based upon a methodology which links each design element with the service it is to provide with an identifiable segment of the population.

d. Population Coverage: The location of primary health care facilities is basically a factor of population density and proximity to the facility. The objective, therefore, should be to locate primary facilities in rural areas with the greatest population concentration, i.e., large towns and clusters of village settlements.

e. Concentration of Services: The primary health care facility should bring together all feasible health services under one roof at the point of consumer contact. This includes services from different ministeries and departments such as family planning, environmental health (sanitation workers), as well as birth and death registrations. In addition, space should be provided at health centers for future dental care units as the health system matures.

The following are the suggested principles that might guide analysts in providing input to policy makers around the issue of who will use the facilities in the long-range plan.

a. Provision for Local Input: As stated earlier, many health facilities have been constructed to meet the needs of the health care providers rather than to meet the needs of the potential users of the services. Burfield (1975) points out that "There may be wide cultural gaps between a modern health facility and the tradition-bound people it is designed to serve. People may, for example, prefer herbalists, spirit doctors, pharmacists, injectionists, traditional midwives, frineds and relatives who offer psychological support in addition to treatment." Therefore, it appears that input from local residents is essential in all phases of the development and implementation of the health facility.

Miskiewicz (1976) also discusses facility utilization and lists twelve factors which could inhibit usage:

1. low motivation for medical care.
2. lack of confidence in, or conviction about the efficacy of certain medical activities.
3. failure of medical care to meet consumers' expectations.
4. insufficient health education.
5. opposed religious convictions.
6. financial considerations-free medical care equals increased use.
7. health or administrative policies which encourage the use of the facility for preventive purposes such as immunization program.
8. accessibility of services-population should know how health care is organized. The need to know how many facilities there are, where located, points of access and the nature of the routes.
9. the behavior and attitude of the medical and auxiliary personnel, which affects patients' utilization, is affected by working conditions, organization, inadequate staff and equipment, professional dissatisfaction, lack of motivation, and absence of feedback on the success of their medical care.
10. public opinion-reaction to changes, etc.
11. sociodemographic factors - size of population, migration, future changes in settlements, or family structure, sex and age groups, handicapped persons. Health information systems often operate with indefinite data whereas the epidemiological information is usually satisfactory.
12. patient attendance-data on patient's contacts with physicians, nurses, social workers, diagnostic units in a given facility and for a certain population will provide a yardstick for defining the expected monthly, daily, hourly workload in similar communities. Also numbers of persons waiting for appointments is an indicator of demand.

b. Population Demand: A decision on the quantity, types and size of the facility to be provided should naturally be based on the projected estimates of population usage over a period of at least ten years. Bridgman (1975) noted that many studies on the utilization of health services have been made. Examples of calculations of this type, based on populations served in a number of LDCs (in Latin America and the Near/Middle East) over a twenty-five year period are given in the appendix. These calculations as given relate to both in- and out-patients for the various types and sizes of health facilities shown.

c. Geography: Geography is surely one of the most important factors to be considered in determining facility utilization. Given poor transportation, ineffective infrastructures, or the high cost of essential logistical support, distance from a facility will sharply reduce the effectiveness of a health unit.

With these principles in mind, the analyst should now be able to structure recommendations to policymakers for long range plans, even on relatively short notice. We turn now to planning operations since the detail of how a health facility functions has not been dealt with thus far.

Operations Planning

Operations planning can be defined as a process whereby goals, objectives, programs or activities, and targets are determined in a systematic fashion in order to ensure that health facility resources, both current and future are adequate to meet the requirements for delivery of health services to a population. It is a dynamic process which is on-going and subject to a great variety of political inputs. Since the development of operations plans for any given country is largely site specific, this manual can only suggest an overall process that may be useful to the analyst in developing one or more plans. The structure suggested here consists of five elements;

(1) Define the basic mission, and determine the approach
(2) Development of objectives
(3) Identification of strategies, programs, or activities
(4) Specification of costs and benefits
(5) Prioritizing of targets

1. Determine the Approach: The first process in the operations planning dynamic is predominantly organizational. For plan development to proceed in an orderly manner, it is important that analysts define their mission and determine their approach. In the process they will consider questions such as:

- Who will develop the plan?
- What resources are available for developing the plan?
- What form will it take when completed?
- Who will see and use the plan when finished and with what result?

Because these factors are so important to the eventual success of the plan, there must be some central direction during these initial processes. Health facilities planners will want to consider the legal and organizational mandates of their work so as to put their jobs in perspective within the overall national development plan.

If sufficient preparation is not made, important participants may be excluded or overlooked; planning functions may be carried out in an uncoordinated or haphazard fashion (or be neglected entirely). Also, there may be no effective method for follow-through between planning andimplementation, or the plan development team may be successful in collecting and analyzing a mass of data but be unable to formulate an intelligible or practical plan.

2. Development of Objectives: This is the first substantive task in operations planning. It requires that the analyst obtain sufficient information on the current health facilities situation (i.e., through the preliminary assessment) in order to determine the "baseline" status of health facilities. This will provide a measure against which the results of plan implementation can be compared.

The analyst uses the data from the preliminary assessment as well as that from the field assessment to develop objectives for the operations plan. Development of objectives is necessary for solving the problems or achieving the goals stipulated in number one above as well as those that data collection has revealed. These goals and objectives should be stated clearly and in terms of measurable progress in alleviating these problems.

To accomplish this tentative agreement, objectives should be obtained from all planning participants as soon as possible in the process. It is of the utmost importance that the decision-makers to whom the ultimate plan will go should not only concur in the goals established but be kept informed of the developing objectives as progress is made. This may be done by asking one or more of each decision-makers' staff to sit with the planning group or to review its work. It should be remembered that some of the participants may have a more restricted point of view--an institutional budgeting process for example. This sort of basic disagreement should be clarified and reconciled as early as possible in the process. This will avoid disagreements in later stages of the plan's development and implementation.

3. Identification of Strategies, Programs, or Activities: Once goals and objectives have been established, the planner must begin to derive programs or activities that will reach the objectives. As these programs or activities take shape, they can and will be constructed as "operational strategies" within the context of the plan. Determining the correct strategy is a difficult task, often made simpler by keeping the process as felxible as possible. Also, over the course of several years, different strategies will be tried to address the same basic ongoing problems; hence, through trial and error, those strategies that

accurately reflect the available range of problem-solving approaches will be derived.

For example, it was once thought in many developing countries that the way to build a strong infrastructure of health facilities that would upgrade the health status of the nation was to build large, foreign-style hospitals and equip them with the latest technical hardware. As these structures proved to be inaccessible to the majority of the population, untrusted to some extent because of their foreign approaches, unsupportive of traditional healers and beliefs, exceedingly expensive to maintain, etc., many countries changed their health delivery strategies to a more accessible, less expensive regional network of health centers supporting district and local health posts.

To develop appropriate strategies for meeting the goals and objectives of the plan, the analyst needs good, up-to-date data on the programs and activities currently being implemented as well as alternative new approaches in each topical area. From these data, a list of a dozen or more strategies involving perhaps hundreds of programs and activities may be derived. At this point, the operations planning process becomes one of priority setting. The analyst must be able to anticipate the negotiations that will take place in deriving the best mix of strategies and programs to meet the overall mission of the country and its current administration within the realistic time and financial constraints that are always present. This need leads us into step four in the process.

4. Specification of Costs and Benefits: This is perhaps the most difficult step in the entire operations planning dynamic. Since one of the main constraints in selecting programs and activities (or building facilities and staffing them) is cost, the analyst must have some measure of costs vs. benefits for each program or activity in order to measure both the effectiveness in meeting the objective and its practicality. To derive such a measure, the planner must quantify the output of the program or activity in some way. As much as is possible, this should be done in terms of human and financial terms.

Examples of procedures for calculating both capital investment and annual cost of operation have been given for various types of health facilities. The capital investment costs may then be amortized over twenty-five years, to which the annual cost of operation is added; the total is then prorated for the population served.

This kind of calculation should be done by the analyst for each program or activity under consideration so that decision-makers will be able to review each on as objective a basis as possible. Utilization of statistical and budgetary experts will greatly facilitate the planner's results in this area.

5. Target Priorities: In a visionary utopia there is always sufficient time and money to accomplish all that needs to be done; in the real world, planners and analysts rarely have such luxuries. Rather, the environment facing the planner is one of scarce resources, competition for those scarce resources, and competing political interests. Thus, the most important step in the whole operations planning is the establishing of priorities for target programs and activities.

Generally, the measure used for determining the optimum trade-offs between and among objectives is the contribution that achieving a given objective makes toward improving the status of health in the country or planning jurisdiction. Likewise, the measure used to determine the best strategies is their effectiveness in achieving selected objectives.

Making these trade-off decisions usually requires that the planner use such tools as cost-benefit analysis (see Step 4 above) or some other gauge of effectiveness/result. It should not be forgotten that in a political world, often such reasonably objective methods for judging the advisability of implementing proposals

are not the methods that actually determine the final outcome of the planning process. More often than not, politics determines who gets what, when, and where. Therefore, it behooves the planner to secure the active participation from the start of key decision-makers in any evolving plan. In this way, support can be built for those choices that appear to have the best chance of surviving the cost-benefit or cost-effectiveness analysis.

Finally, the entire operations planning process must be recognized as an interdependent one in which many approaches will usually be needed to solve a single problem. The analyst's plan must be flexible enough to utilize updated information to increase the breadth and systematic nature of its search for, and analysis of, problem-solving alternatives.

The figure on the following page provides a brief and very simplistic illustration of the operations planning process. It also displays via a sample the discrete steps discussed above. Figures are given for example's sake and, of course, are not to be taken literally.

## AN ILLUSTRATION OF THE FACILITIES OPERATIONS PLANNING PROCESS

| | | | | | |
|---|---|---|---|---|---|
| | | Ensure that health facilities are adequate to meet national health service delivery requirements. | | | STEP 1: Definition of goals |
| Upgrade by 10% the accessibility of population to present health facilities. | | Increase health facilities' utilization by 15% within one year. | | Develop health facilities budget nationwide. | STEP 2: Development of objectives. |
| Build new rural health posts by next year. | Develop mobile health teams in 5 new regions. | Upgrade paraprofess-ional training programs by 25% in next year. | Consolidate all health services in one bldg. in all regions within six months. | Complete budget analysis by June of next year. | STEP 3: Identification of strategies, programs or activities. |
| $100,000 with 100,000 new patients served | $36,000 with 25,000 new patients served | $30,000 with 150 new village workers trained | $60,000 with 5,000 new patients served | $2,000 with useful planning document | STEP 4: Specification of costs and benefits. |

1. Build 10 health posts.
2. Develop mobile teams.
3. Upgrade training programs.
4. Complete budget analysis.
5. Consolidate services.

STEP 5: Prioritizing of targets.

Any approach the planner uses to develop the operations plan will be submitted formally to a superior for approval. These findings must then be implemented to a greater or lesser extent to solve a health facilities problem. All of the foregoing discussion has been aimed at providing the analyst with an understanding not only of the discrete (but interrelated) steps leading up to the development of an operations plan, but also of the dynamic nature of the process itself and the environment within which that process must function. Health facilities planning and assessment is an evolutionary process designed to assure that the facilities required to delivery health services to a population will be available when and where they are needed. The analyst must always be ready to change, adapt or redirect the plan as the population and its needs change.

# APPENDICES

## APPENDIX A:

## PUBLICATIONS WITH MOST UP-TO-DATE DATA

Abstracts of Hospital Management Studies. International journal with abstracts of studies of management, planning and public policy related to the delivery of health care. Classified arrangement with author and subject indexes. Quarterly with annual cumulations. Co-operative Information Center for Hospital Management Studies, School of Public Health, University of Michigan, Ann Arbor, Michigan 48104, United States of America. (W.H.)

African Medical and Research Foundation, P. O. Box 30125, Nairobi, Kenya. (W.H.)

Agricultural medicine and rural health. Periodic journal of the International Association of Agriculture Medicine and Rural Health, c/o Dr. Toshikazy Wakatsuki, Saku Central Hospital, 197 Usuda Machi, Minami Saku Gun, Nagano Prefecture 384 03, Japan. (W.H.)

American Public Health Association, Division of International Health Programs, 1015 Eighteenth Street, N.W., Washington, D.C. 20036, USA. (W.H.)

British Medicine. Guide to current literature, including British books, research reports, government publications and principal contents of British medical periodicals. Arranged alphabetically by author within wide subject areas. Monthly, annual, author and subject indexes. Medical Department, British Council, 10 Spring Gardens, London SW1 2BN, Great Britain. (W.H.)

Cajanus. Bi-monthly journal of the Caribbean Food and Nutrition Institute covering aspects of health care and planning as well as nutrition. P. O. Box 140, Kingston 7, Jamaica. (W.H.)

Christian Medical Commission, World Council of Churches, 150 Route de Ferney, 1211 Geneva 20, Switzerland. (W.H.)

Contact. Periodical paper of the Christian Medical Commission (CMC) dealing with aspects of Christian communities' involvement in health and reporting innovative approaches to promotion of health care. CMC, World Council of Churches, 150 Route de Ferney, 1211 Geneva 20, Switzerland. (W.H.)

Courier. (European Community: Africa-Caribbean-Pacific.) Bi-monthly published by the Commission of the European Communities. Includes health topics amongst reports and articles relating to development and the Lome' Convention. 200 Rue de la Loi, B-1049 Brussels, Belgium. (W.H.)

Excerpta Medica. Section 36: Health Economics and Hospital Management. International medical abstracting service. Classified arrangement with subject and author indexes. 20 issues a year, cumulative index. Excerpta Medica, Keizergracht 305, Box 1126, Amsterdam, The Netherlands. (W.H.)

Health Notes. A periodic newsletter from the Committee for Health Concerns, Christian Conference of Asia. Edited by Susan B. Rifkin, Technical Consultant, Christian Conference of Asia, c/o Hong Kong Christian Council, 57 Peking Road 4/F, Kowloon, Hong Kong. (W.H.)

Hospital Abstracts. Survey of world literature covering the whole field of hospitals and their administration, with exception of strictly medical and related professional matters. Classified arrangement with author and subject indexes. Monthly. Department of Health and Social Security, Alexander Fleming House, Elephant and Castle, London SE1 6BY, Great Britain. Subscriptions from Her Majesty's Stationary Office, P. O. Box 569, London SE1 9NH. (W.H.)

Hospital Literature Index. An index to publications received in the library of the American Hospital Association; covering administration, planning, and financing of hospitals and related health care institutions, and the administrative aspects of the medical, paramedical and prepayment fields. Alphabetical author and subject indexes. Quarterly with annual and five-year cumulations. American Hospital Association, 840 North Lake Shore Drive, Chicago, Illinois 60611, United States of America. (W.H.)

Institute of Development Studies, University of Sussex, Brighton BN1 9RE, England. (W.H.)

Intermediate Technology Development Group, Parnell House, 25 Wilton Road, London SW1V 1JS, England. (W.H.)

International Association of Agricultural Medicine and Rural Health, c/o Dr. Wasktsuki Director, Saku Central Hospital, 197 Usuda-machi Minami Saku-gun, Nagano Prefecture 384-03, Japan. (W.H.)

International Development Research Center, Box 8500, Ottawa Ontario K1G 3H9, Canada. (W.H.)

International Directory of graduate and undergraduate programs and centers for advanced study in health administration issued by the Association of University Programs in Health Administration (AUPHA), Suite 420, One Dupont Circle, Washington, D.C. 20036, USA. (A.H.)

International Hospital Federation, 126 Albert Street, London NW1 7NF. (W.H.)

International Journal of Epidemiology. Quarterly journal of the International Epidemiological Association, publishing original work, reviews and letters in the fields of research and teaching in epidemiology. Oxford University Press, Ely House, London W1, England. (W.H.)

International Journal of Health Services. Quarterly journal devoted to subjects of policy, planning, administration and evaluation of health services. Baywood Publishing Co., Inc. 43 Central Drive, Farmingdale, New York 11735, USA. (W.H.)

National Institute of Health Administration and Education, E-16 Greater Kailash, New Delhi - 110048, India. (W.H.)

Pan American Health Organization, Pan American Sanitary Bureau, Regional Office of the World Health Organization, 525 Twenty-third Street, N.W., Washington, D.C., 20037, USA. (W.H.)

Panorama. Paper published eight times a year by the League of Red Cross Societies. Includes reports of developments in disaster relief, health care and voluntary work. P. O. Box 276, 1211 Geneva 19, Switzerland. (W.H.)

The National Health Planning Information Center, P. O. Box 31, Rockville, Maryland 20850, USA. (W.H.)

Voluntary Health Association of India, C-45 South Extension Part II New Dehli-110049, India. (W.H.)

World Hospitals. Quarterly journal of the International Hospital Federation with articles and reports on various aspects of international developments in the planning and operation of hospitals and health services. 126 Albert Street, London NW1 7NF, England. (W.H.)

## APPENDIX 2

## DECLARATION OF ALMA-ATA

Convened in Alma-Ata, capital of Soviet Kazakhistan, the International Conference on Primary Health Care held September 6-12, 1978 was co-sponsored by the World Health Organization and the United Nations Childrens Fund (UNICEF), and attended by delegations from 140 nations and by representatives of international agencies and non-governmental organizations.

### Declaration of Alma-Ata

The International Conference on Primary Health Care - sponsored jointly by the World Health Organization and the United Nations Children's Fund - concluded its work here today with the adoption of a "Declaration of Alma-Ata." The declaration, approved unanimously by delegates from 140 nations and numerous non-governmental organizations, calls for urgent and effective international and national action to develop and implement primary health care throughout the world and particularly in developing countries.

The full text of the "Declaration of Alma Ata" is as follows:

"The International Conference on Primary Health Care, meeting in Alma-Ata this twelfth day of September in the year Nineteen hundred and seventy-eight, expressing the need for urgent action by all governments, all health and development workers, and the world community to protect and promote the health of all the people of the world, hereby makes the following declaration:

I

The conference strongly reaffirms that health, which is a state of complete physical, mental and social wellbeing, and not merely the absence of disease or

infirmity, is a fundamental human right and that the attainment of the highest possible level of health is the most important world-wide social goal whose realization requires the action of many other social and economic sectors in addition to the health sector.

II

The existing gross inequality in the health status of the people, particularly between developed and developing countries as well as within countries, is politically, socially and economically unacceptable and is, therefore, of common concern to all countries.

III

Economic and social development, based on a new international economic order, is of basic importance to the fullest attainment of health for all and to the reduction of the gap between the health status of the developing and developed countries. The promotion and protection of the health of the people is essential to sustained economic and social development and contributes to a better quality of life and to world peace.

IV

The people have the right and duty to participate individually and collectively in the planning and implementation of their health care.

V

Governments have a responsibility for the health of their people which can be fullfilled only by the provision of adequate health and social measures. A main social target of governments, international organizations and the whole world community in the coming decades should be the attainment by all peoples of the world by the year 2000 of a level of health that will permit them to lead a socially and economically productive life. Primary health care is the key to attaining this target as part of development in the spirit of social justice.

VI

Primary health care is essential health care based on practical, scientifically sound and socially acceptable methods and technology made universally accessible to individuals and families in the community through their full participation and at a cost that the community and country can afford to maintain at every stage of their development in the spirit of self-reliance and self-determination. It forms an integral part both of the country's health system, of which it is the central function and main focus, and of the overall social and economic development of the community. It is the first level of contact of individuals, the family and community with the national health system bringing health care as close as possible to where people live and work, and constitutes the first element of a continuing health care process.

VII

Primary health care:

1. Reflects and evolves from the economic conditions, and socio-cultural and political characteristics of the country and its communities and is based on the application of the relevant results of social, biomedical and health services research and public health experience.
2. Addresses the main health problems in the community, providing promotive, preventive, curative, and rehabilitative services accordingly.
3. Includes at least: education concerning prevailing health problems and the methods of preventing and controlling them, promotion of food supplies and proper nutrition, an adequate supply of safe water and basic sanitation, maternal and child health care, including family planning, immunization against the major infectious diseases, prevention and control of locally endemic diseases, appropriate treatment of common diseases and injuries, and provision of essential drugs.

4. Involves, in addition to the health sector, all related sectors and aspects of national and community development, in particular agriculture, animal husbandry, food, industry, education, housing, public works, communications and other sectors and demands the coordinated efforts of all those sectors.
5. Requires and promotes maximum community and individual self-reliance and participation in the planning, organization, operation and control of primary health care, making the fullest use of local, national and other available resources, and to this end develops through appropriate education the ability of communities to participate.
6. Should be sustained by integrated, functional and mutually-supportive referral systems, leading to the progressive improvement of comprehensive health care for all and giving priority to those most in need.
7. Relies, at local and referral levels, on health workers, including physicians, nurses, midwives, auxiliaries and community workers as applicable, as well as traditional practitioners as needed, suitably trained socially and technically to work as a health team and to respond to the expressed health needs of the community.

VIII

All governments should formulate national policies, strategies and plans of action to launch and sustain primary health care as part of a comprehensive national health system and in coordination with other sectors. To this end, it will be necessary to exercise political will, to mobilize the country's resources and to use available external resources rationally.

IX

All countries should cooperate in a spirit of partnership and service to ensure primary health care for all people, since the attainment of health by people in any one country directly concerns and benefits every other country. In this context the joint WHO/UNICEF report on primary health care constitutes a solid basis for the further development and operation of primary health care throughout the world.

X

An acceptable level of health can be attained for all the people of the world by the year 2000 through a fuller and better use of the world's resources, a considerable part of which are now spent on armaments and military conflicts. A genuine policy of independence, peace, detente and disarmament could and should release additional resources that could well be devoted to peaceful aims and in particular to the acceleration of social and economic development of which primary health care as an essential part should be allotted its appropriate share.

The International Conference on Primary Health Care calls for urgent and effective international and national action to develop and implement primary health care throughout the world and particularly in developing countries in a spirit of technical cooperation and in keeping with a new international economic order. It urges governments, WHO and UNICEF, and other international organizations, as well as multilateral and bilateral agencies, non-governmental organizations, funding agencies, all health workers and the whole world community to support national and international commitment to primary health care and to channel increased technical and financial support to it, particularly in developing countries. The conference calls on all the aforementioned to collaborate in introducing, developing and maintaining primary health care in accordance with the spirit and content of thie Declaration.

The International Conference on Primary Health Care also adopted unanimously twenty-two specific recommendations dealing with the following:
1) Interrelationship between health and development;
2) Community participation;

3) National administrations and primary health care;
4) Interdisciplinary coordination;
5) Content of primary health care:
6) Local level health care:
7) Health service support for primary health care:
8) Vulnerable and high risk groups;
9) Health manpower classification;
10) Training of health workers;
11) Incentives for difficult work;
12) Appropriate technology for health;
13) Essential drugs;
14) Logistical support for primary health care;
15) Administration and management;
16) Research and operational studies;
17) Resources for primary health care;
18) National commitment to primary health care:
19) National strategies for primary health care:
20) Technical cooperation in primary health care:
21) International support;
22) Role of WHO and UNICEF in supporting primary health care.

## APPENDIX C:

## CHECKLIST OF CONTACTS

(1) Country Ministry of Health and Other Relevant Ministries
   (a) Priorities, Schedules, Data Sources, Plan Field Visits, Logistical Supervision
(2) Other Key Personnel and Agencies
   (a) US AID/Country Mission and U. S. Embassy
   (b) Province (State), District and Local Officials
   (c) Representatives of International Organizations (i.e., WHO, UNICEF, FAO, Red Cross, etc.)
   (d) Representatives of other Multilateral as well as bilateral Country assistance programs
   (e) Heads of Existing Organizations and Facilities (Voluntary, Religious)
      - Community Needs
      - Utilization Patterns
   (f) Universities
   (g) Military

## APPENDIX D:

## ASSESSMENT FORMS

Following are several assessment forms which may be used for the assessment process. Each team should have a supervisor or team member well versed in statistics. Before undertaking a field assessment, a data analysis plan should be developed. This data analysis is necessary so that when the data has been collected, its processing will be facilitated.

ASSESSMENT FORM FOR HEALTH FACILITIES

1. Name of facility: _____ 2. Date of assessment interview: _____

3. Type and Number of Facilities:

| | | | |
|---|---|---|---|
| primary | ___ | clinic | ___ |
| secondary | ___ | hospital | ___ |
| tertiary | ___ | | |
| specialty | ___ | | |
| short term | ___ | mobile | ___ |
| preventive | ___ | stationary | ___ |
| curative | ___ | | |
| isolation | ___ | | |

4. Location: _____
(urban ___ rural ___)

5. Age of Facility: projected
0 - 5 years ___
6 - 20 years ___
20 - & above ___

6. Administration:

| | | | |
|---|---|---|---|
| military | ___ | nonprofit | ___ |
| public | ___ | profit | ___ |
| private | ___ | local | ___ |
| | | international | ___ |

7. Access:

| | |
|---|---|
| Roads, paved | ___ |
| Roads, unpaved | ___ |
| railway | ___ |
| river | ___ |
| air | ___ |

Distance: residence to facility: _____.

8. Communications:

| | |
|---|---|
| telephone | ____ |
| telegraph | ____ |
| courier | ____ |
| radio station | ____ |
| television | ____ |
| printers | ____ |
| movie houses | ____ |

9. Financial data:
Source of income for facility _____.

Expenses itemized by functional services:
(labor intensive)
1.
2.
3.
4.
5.

Expenses itemized by resources expended:
(capital intensive)
1.
2.
3.
4.
5.

10. Total Patient Population: week _____
month _____
annual _____

11. Expenses per Unit of Service:

_____

12. Estimated total expense and per capita expense per person:

_____

13. Hours of operation: _____

Note: This form should be used in conjunction with the Assessment Form for Resources Financial.

## ASSESSMENT FORM FOR HEALTH FACILITIES

CODES
1 Exceptional
2 Adequate
3 Needs Improvement
4 Inadequate
5 No Information Available

| | | | | | |
|---|---|---|---|---|---|
| MEDICAL RECORDS | 1 | 2 | 3 | 4 | 5 |
| Use and Design of Records | 1 | 2 | 3 | 4 | 5 |
| Use of School Children to make records | 1 | 2 | 3 | 4 | 5 |
| Producing, Handling and Assessing Status | 1 | 2 | 3 | 4 | 5 |
| Examples of Patient Retained Records | 1 | 2 | 3 | 4 | 5 |

SOCIOMEDICAL

Home Visiting

School Visiting

Community Hygiene

Nutrition and Food

ASSESSMENT FORM FOR POTENTIAL USERS OF THE HEALTH FACILITY

1. Name of user:_____ 2.Date of Interview _____ 3. Sex _____ Age_____
inside _____ Tribe_____
outside _____ Ethnic/Linguistic Group
_____

4. Residence: urban ___ rural ___ nomadic ___.

5. No. of children in family:
pre-natal ( ) _____
natal ( ) _____
post-natal ( ) _____
neo-natal ( ) _____

2 - 5 yrs. _____
6 - 12 yrs. _____
13 - 19 yrs. _____

6. No. of adults in family:
_____ _____
(no.) (relation)
_____
_____
_____
_____

Educational Level:
_____
_____
_____
_____

Marital status:
single ____ married ____
divorced ____ widowed ____

Religion/beliefs: _____

7. Facility: Distance from the nearest facility: _____ miles/kilometers.
Mode of Transportation to faciliey: _____

8. Present form of employment: _____. 9. Per Capita Income: _____

10. Types of Illness:

Acute: _____

Chronic: _____

11.Number of encounters with health practitioner:
_____
type _____ outcome _____
where_____ when _____

12. Nutrition: Food availability:
Food preferences:
Water supply:

ASSESSMENT FORM FOR ENVIRONMENTAL FACTORS

CLIMATE -- MAIN ELEMENTS

1. TEMPERATURE RANGE AND SOLAR RADIATION

| | | | |
|---|---|---|---|
| a) cold | below 10°C | (below 50°F) | _____ |
| b) cool | 10° - 15°C | (50° - 60°F) | _____ |
| c) temperate | 15° - 27°C | (60° - 80°F) | _____ |
| d) hot | 27° - 38°C | (80° -100°F) | _____ |
| e) very hot | above 38°C | (above 100°F) | _____ |

To determine solar radiation, the direction and height of the sun according to different latitudes are the key factors.

2. RELATIVE HUMIDITY

| | | |
|---|---|---|
| a) very dry | 0 - 25% | _____ |
| b) dry | 25 - 50% | _____ |
| c) humid | 50 - 75% | _____ |
| d) very humid | 75 - 100% | _____ |

3. PREVAILING WINDS

Direction of air movement:
north _____
south _____
east _____
west _____

PRECIPITATION

Impact on temperature and humidity:
_____

Drainage provisions: _____
_____

Avg. rainfall per year:_____

Length of rainy season: _____. What months: _____

4. MACROCLIMATE

| | | | |
|---|---|---|---|
| a) cool | 10 - 15°C | | _____ |
| b) hot, dry | 27 - 38°C | 25% - 50% rel. humidity | _____ |
| c) hot, humid | 27 - 38°C | 50% - 75% rel. humidity | _____ |
| d) warm, humid | 20 - 30°C | 50% - 75% rel. humidity | _____ |

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5. GEOGRAPHICAL FACTORS

| | | | | | |
|---|---|---|---|---|---|
| Topography: | hilly | _____ | rocky | _____ | cities | _____ |
| | flat | _____ | valley | _____ | vegetation | _____ |
| | mountainous | _____ | bridges | _____ | rivers, lakes, canals. | _____ |
| | altitude (in meters) | _____ | roads | _____ | | |

Terrain:

Natural features: _____

Suitability for health facility: _____

6. ECOLOGY

comment

a) Industrialization, hazards

b) Growth of population

c) Urbanization
- high population density
- housing shortage
- sanitation needs
- water supply
- nutritional changes

d) Population carrying capacity

e) Land Use

f) Pollution Assimilation capacity

g) Technological Choices

h) Recycling possibilities

i) Identify environmental values

j) Raw material management

k) Waste management

l) Introduction/ redistribution of disease

m) Occupational health

## RELATIVE HUMIDITY

| Temp. (F) | | | | | | |
|---|---|---|---|---|---|---|
| 86° | 16% | 24% | 31% | 45% | 57% | 100% |
| 68° | 28% | 42% | 54% | 79% | 100% | |
| 61° | 36% | 53% | 69% | 100% | | |
| 50° | 52% | 77% | 100% | | | |
| 43° | 67% | 100% | | | | |
| 32° | 100% | | | | | |
| | 4.85 | 7.27 | 9.41 | 13.65 | 17.31 | 30.4 |

Grams of water vapor per cubic meter

## IMPORTANT FACTS ABOUT AIR MASSES

| Air Mass | Stability | Turbulence | Surface visibility | Clouds | Precipitation |
|---|---|---|---|---|---|
| cold | unstable | turbulent, gusty | good | cumulus | thunder-showers |
| warm | stable | steady winds | poor | stratus | drizzle |

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ASSESSMENT FORM FOR:

ARCHITECTURAL FACTORS

(1) VENTILATION
(2) FLOORS
(3) ROOF
- (a) Low
- (b) Flat
- (c) High
- (d) Thatched
- (e) Gabled
- (f) Sloping
- (g) Valley
- (h) Hip

(4) WINDOWS
(5) WALLS
- (a) Solid
- (b) Light
- (c) Cavity

(6) MATERIALS
- (a) Paints

(7) SHRUBBERY
(8) PROXIMITY TO OTHER BUILDINGS
(9) SPACING
(10) HEIGHT
(11) DIRECT OR REFLECTED LIGHT (ILLUMINATION)
(12) WINDOW COVERINGS FOR DAYLIGHT, VENTILATION, PEST CONTROL (SCREENS, CHEMICALS)
(13) OTHER MATERIALS
- (a) Brick
- (b) Cement
- (c) Sand
- (d) Timber
- (e) Steel
- (f) Tiles
- (g) Glass
- (h) Hardware
- (i) Pre-Fabrication
- (j) Finishes

(14) DOUBLE-LAYERED CONSTRUCTION
(15) BUILDING SPATIAL THEME IN DIRECTION AND FOCAL POINT, SUCH AS MAJOR ENTRANCE, WAITING AREAS, BUILDING AVENUES
(16) OPEN BUILDING
(17) FLEXIBLE-CABLE OF GROWTH AND EXPANSION
(18) BUILDING
- (a) Educational Tool
- (b) Meaningful Employment

(19) LANDSCAPE
(20) COSTS
(21) FOUNDATION
(22) ROADS
(23) LATRINES AND SEWAGE DISPOSAL
(24) WATER STORAGE AND PURIFICATION
(25) SITE SIZES
(26) LAY-OUT
- (a) Sun & Shade Control
- (b) Orientation of building
- (c) Waiting Areas
- (d) Social Area & Kitchen
- (e) Operating Theater
- (f) Waiting Area
- (g) Pharmacy or Dispensary
- (h) Laboratory & X-ray
- (i) Central Facilities, Kitchen, Laundry, stores, maintenance, generators
- (j) Administrative & record areas
- (k) Nursing units (wards, semi-private)
- (l) Out-patient Department
- (m) Public Health Center, incl. health immunization areas, nutrition, education, sanitarian, home visiting
- (n) Hostels
- (o) Staff Housing
- (p) Quarantine Areas (Isolation)
- (q) Reception & Admitting Office

SUMMARY OF ESTIMATE FOR PROTOTYPE OF HEALTH POST (SMALL)

Area Constructed in m2 92 m2 @ _____ per m2 =

| | COST |
|---|---|
| A. Patient Services | |
| 1. Building Construction | |
| 2. Water supply | |
| 3. Sewage Disposal | |
| 4. Power Supply | |
| 5. Site Work | |
| 6. Fixed Equipment (Group I) | |
| Sub-Total | _____ |
| B. Portion of cost for complementary services | _____ |
| C. ___% escalation; until_____target date | _____ |
| Estimated Total | |
| D. Plus cost of Movable Equipment (Group II) | _____ |
| GRAND TOTAL | _____ |

SUMMARY OF ESTIMATE FOR PROTOTYPE OF HEALTH POST (INTERMEDIATE)

Area constructed in m2 for the:

Principal structure - 819.00 m2 @ _____ per m2 =
- 93.15 m2 @_____ per m2 = _____

Total Area 912.15 m2; & Total Cost

| | Cost |
|---|---|
| A. Patient Services | |
| 1. Building construction | |
| 2. Water Supply | |
| 3. Sewage disposal | |
| 4. Power supply | |
| 5. Site work | |
| 6. Fixed Equipment (Group I) | |
| Sub-Total | _____ |
| B. Nurses and auxiliaries house | |
| Portion of cost for 93.15 m2 complimentary services | _____ |
| Total of A + B | |
| C. ____% escalation; until _____target date | _____ |
| Estimated Total | |
| D. Plus cost of Movable Equipment (Group II) | _____ |
| GRAND TOTAL | _____ |

ASSESSMENT FORM FOR:

UTILIZATION

FACTORS AFFECTING UTILIZATION:

(1) LOW MOTIVATION FOR MEDICAL CARE

(2) LACK OF CONFIDENCE OR CONVICTION ABOUT EFFICACY OF CERTAIN MEDICAL ACTIVITIES

(3) FAILURE TO MEET CONSUMERS' EXPECTATIONS

(4) INADEQUATE HEALTH EDUCATION

(5) RELIGIOUS CONVICTIONS

(6) FINANCIAL CONSIDERATIONS (LOW-COST = INCREASED USE)

(7) POLICIES ENCOURAGING PREVENTIVE PROGRAMS

(8) ACCESSIBILITY OF SERVICES

(9) BEHAVIOR AND ATTITUDE OF HEALTH PERSONNEL

(10) PUBLIC OPINION

(11) SOCIO-DEMOCRAPHIC FACTORS

(12) PATIENTS ATTENDANCE AND WAITING TIME

(13) PATIENT SATISFACTION

(14) KINDS OF PROBLEMS (ILLNESS) FOR WHICH HELP IS SOUGHT

(15) RECORD-KEEPING

(16) RATIOS OF SERVICE TO POPULATION TO INDICATE EFFECTIVENESS

(17) LOCATION OF FACILITIES

(18) NUMBER OF PEOPLE SERVED

(19) DISTRIBUTION AND/OR GROUPING OF CENTERS

(20) LONG-RANGE PLANNING PROBLEMS

Note: A questionnaire should be developed to elicit information on the people's attitudes, feelings, and other factors which affect utilization of health facilities.

ASSESSMENT FORM FOR

FACILITY SITE CHARACTERISTICS

| | | LOW - - - - - - - - - - HIGH | | | | |
|---|---|---|---|---|---|---|
| (1) | CENTER FOR COMMUNICATION | 1 | 2 | 3 | 4 | 5 |
| (2) | ORGANIZATION OF VILLAGE OR SOCIAL STRUCTURE | 1 | 2 | 3 | 4 | 5 |
| (3) | SLIGHTLY ELEVATED | 1 | 2 | 3 | 4 | 5 |
| (4) | DRAINAGE | 1 | 2 | 3 | 4 | 5 |
| (5) | WATER SOURCE | 1 | 2 | 3 | 4 | 5 |
| (6) | SEWAGE TREATMENT | 1 | 2 | 3 | 4 | 5 |
| (7) | NEAR TRANSPORTATION | 1 | 2 | 3 | 4 | 5 |
| (8) | ELECTRICITY | 1 | 2 | 3 | 4 | 5 |
| (9) | INSECT INFESTATION (Mosquitoes, Termites, Flies) | 1 | 2 | 3 | 4 | 5 |
| (10) | DIFFICULTY OF RIVER CROSSING | 1 | 2 | 3 | 4 | 5 |
| (11) | DISPUTED LAND | 1 | 2 | 3 | 4 | 5 |
| (12) | HARD TO GET TO - ACCESSIBILITY | 1 | 2 | 3 | 4 | 5 |
| (13) | HILLS | 1 | 2 | 3 | 4 | 5 |
| (14) | FLOODING | 1 | 2 | 3 | 4 | 5 |

ASSESSMENT FORM FOR RESOURCES

FINANCIAL

| | When needed (from - to) | | | | Costs | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | URBAN | RURAL | PUBLIC | PRIVATE | URBAN | RURAL | PUBLIC | PRIVATE | URBAN | RURAL | PUBLIC | PRIVATE |
| FINANCIAL RESOURCES NEEDED | | | | | | | | | | | | |
| A. Operating Expenses | | | | | | | | | | | | |
| 1. Workers Needed: | | | | | | | | | | | | |
| professionals | | | | | | | | | | | | |
| full time | | | | | | | | | | | | |
| part time | | | | | | | | | | | | |
| non-professionals | | | | | | | | | | | | |
| full time | | | | | | | | | | | | |
| part time | | | | | | | | | | | | |
| 2. Material and Supplies: | | | | | | | | | | | | |
| 3. Other Operating Expenses | | | | | | | | | | | | |
| B. Capital Expenditures | | | | | | | | | | | | |
| 1. Buildings | | | | | | | | | | | | |
| 2. Major Equipment | | | | | | | | | | | | |
| 3. Vehicles | | | | | | | | | | | | |
| OWNERSHIP | | | | | | | | | | | | |
| Who owns facility: | | | | | | | | | | | | |
| Who benefits: | | | | | | | | | | | | |
| Who has a vested interest: | | | | | | | | | | | | |

Note: This form should be used in conjunction with the Assessment Form for Health Facilities

## ASSESSMENT FORM FOR POPULATION CHARACTERISTICS

1. TOTAL POPULATION

Geographic distribution:
% rural _____
% small town _____
% city _____

2. ETHNIC/LINGUISTIC GROUPS

_____
_____
_____
_____

3. AGE OF POPULATION

_____ % under 20 years
_____ % 20 - 34 years
_____ % 35 - 45 years
_____ % 46 - 59 years
_____ % 60 and over

4. ETHNIC ORIGIN & SEX
(ratios of males/100 families)

_____ % men
_____ % women
_____ % men
_____ % women

5. AVERAGE SCHOOL YEARS COMPLETED

_____ % less than 8 years
_____ % completed sceondary school
_____ % some education beyond secondary school
_____ % college

6. EMPLOYMENT LEVEL / INCOME LEVEL

____ % unemployed _____
____ % student _____
____ % housewives _____
____ % professional _____
____ % managerial _____
____ % clerical _____
____ % blue collar _____

7. MIGRATORY PATTERNS

_____
_____
_____
_____

8. POPULATION TRENDS

_____
_____

9. RELIGIOUS GROUPS

_____
_____
_____
_____

10. MARITAL STATUS

_____ % married _____ % widowed
_____ % single _____ % divorced
_____ % separated _____ % remarried

11. HOUSEHOLD COMPOSITION AND FAMILY STRUCTURE: Household Size _____ (inhabitants).

Children under 18 years of age living with parents _____

Age of household head _____. Youth dependency ratio _____
(under 18 per 100 persons)

Aged dependency ratio _____ (65 and over per 100 persons).

12. PERSONS IN INSTITUTIONS:

prisons _____
orphanages _____
mental institutions _____
homes for the aged _____
isolation care facilities _____
disaster facilities _____
other _____

13. PERSONS NOT IN FAMILIES:

_____

_____

_____

14. HEALTH STATUS

mortality _____
morbidity _____
incidence _____
prevalence _____
birth rate _____
rate of population change _____
life expectancy _____

15. ECONOMICS

Percentage of gross national product (GNP) allotted for health: _____

Distribution of wealth (per capita income): _____ _____

Local economic base and trends: _____

APPENDIX E:

SOCIAL INSURANCE

In many Less Developed Countries social security programs for Health are relative new. The military hospitals and programs designed to deliver health care to armed services personnel were among the first organized social security systems. For example, in Latin America the military hospitals are important because they were among the first institutions established by the Spanish colonist. The military, and also the police, are regarded as extremely important elements in the maintenance of stability in Latin American societies. This may be true in many LDC, and the financial allocations to military and police groups are disproportionately large. The general level of medical care they receive tends to be higher than that provided or available to the general population.

Another early organized program for health care is the charity system. Again the charity system was established primarily by colonist in LDC. In many cases charity hospitals and programs are administered by groups with religious and international affiliations. The charity system of medical care was originally a symbol of colonial attitudes and values, they remain, however, an essential and contributing asset to health care systems in Less Developed Countries.

As political independence and industrialization emerged in LDC, the newly formed government often established a system of social insurance for medical care and other benefits to selected groups.

The provisions of the social security laws regarding the source of funds, coverage, risks, qualifying conditions and so on will be different from country to country. However, the differences notwithstanding, a social insurance system can influence significantly medical care and its operation. To illustrate how medical care is influenced and how facilities are utilized it may be useful to examine and cite examples applicable to Latin America.

Most social insurance for health programs in Latin America are administered by government established simiautonomous boards which are entrusted with legal power to collect insurance contributions from employers and workers, to receive funds from government health ministries and to provide service and benefits.

The beneficiaries of insurance programs are designated by class and/or economic differences with varying conditions of coverage. In the case of Peru, two programs operate side by side for manual workers and for white-collar workers. In Brazil and Mexico there exist separate agencies for promoting health care of workers in specific occupations. Each occupation maintains its own agency or "institutes" for providing service to its members. In certain instances there may exist five or six separate social insurance programs each with its own health delivery system.

The insurance programs are usually financed by employee contribution based on percentage of wage, employer contribution and government tax support.

The major drawback (since insurance contributions are based on a set percentage of wages) is that different wages of occupations makes contributions unequal.

In Peru manual workers and white collar workers maintain separate health facilities. The white collar workers have a "free choice" as to whether to seek private practitioner treatment or treatment at an institute hospital. Manual workers can obtain care only at their insitute hospitals if they wish financial insurance coverage.

In countries where many separate health institutes exist, they often have their own hospitals, or institutes may contract for health care to selected existing hospitals. Also, several institutes combining to establish a hospital is not uncommon.

Insurance to cover health care based on occupation and class differences inevitably neglects certain groups and sustains inequitable treatment. In Mexico for example institutes exist for transportation, agriculture, industry and commercial workers. However, the important exclusions are domestic workers, family labor and temporary employees. Moreover coverage based on occupation does not allow for geographic differences among employed groups. Concentrations of occupations may vary significantly within a country. Occupational concentrations influence the location of facilities and thereby health treatment.

Insured persons experience an uneven quality of medical care even if they belong to the same program. Availability of health care differs greatly between rural and urban areas. There is also a lack of uniformity in insured groups. Some programs allow for coverage to dependents, others provide monetary benefits, and some administer care only in accident related injuries.

Government initiated social insurance programs almost always neglect the indigent peoples since such programs are intended primarily for the workers. Indigents must rely on charity institutions, where quality is low because of heavy demand and insufficient resources, for health care.

The above illustrates the general situation with respect to social insurance for selected groups. In assessing a social insurance system of any country in Latin America the major questions to consider are, Is it comprehensive in nature and universal in coverage.

## APPENDIX E:

## THE ESSENTIAL NATURE OF THE MEDICAL RECORD - RELATION TO THE FACILITY AND PROGRAM

### Record Linkage

The medical record is a communicating link among the different persons concerned with providing care to an individual. The medical record must be designed to connect the care or treatment rendered at different times or places so that the individual's needs can be met. The use of a "unit record" serves this purpose when all care is given at one facility. When care is divided among ambulatory care programs and hospitals, special attention must be given to the problems of record linkage.

### Levels of Linkage

The patient care relationships of the health care plan to other health facilities may be described in terms of levels of service linkage. Zero level would be a free-standing health care facility with no outside affiliations. First level of linkage refers to a facility which has affiliations with two or more hospitals or extended care facilities. The third level of service linkage is that which exists between multiple facilities and multiple hospitals with a central coordinating agency.

At each of these levels, record linkage must be provided. At the zero level, a free-standing program with no other affiliation can satisfy its record linkage requirements through the unit record. At the first level (one plan and one hospital) record linkage may be achieved in several ways. One way should be to transfer the patient's record back and forth between the facility and the hospital. Requirements for such a system include:

- dependable messenger service;
- efficient filing controls on record routing and record location
- an effective appointment system;
- and fast, accurate communication between cooperating facilities and their staffs

Provision must be made for record notations at those times when a patient presents himself as a walk-in for treatment and the record is not at that facility. A second way to achieve linkage is to maintain duplicate records at the hospital and satellite clinic. This method requires that copies of each episode of treatment at either facility be forwarded promptly to the other. Good duplicating equipment or forms designed with carbons incorporated is essential. A third way is to exchange medical abstracts. Summaries promptly completed and submitted to the other facility eliminates record transportation and assure that the needed record is always available at either facility. These summaries simplify the filing controls over record maintenance, location, and routing, and reduce the bulk of the record.

Linkage of records at the second level (one facility and multiple hospitals) may be achieved most efficiently by exchange of abstracts.

Factors Affecting Linkage

Standardization of format is an important factor. Plans and hospitals which choose to transfer patient records back and forth or to exchange discharge summaries must develop and use a standard format for recording information.

## APPENDIX F:

## JOURNALS, PUBLICATIONS, AND ORGANIZATIONS

## OF PERTINENT INTEREST TO THE HEALTH SERVICES FACILITIES

African Studies, 1974-1978
American Economic Association, Manpower Studies, 1960-1978
American Economic Review, 1960-1978
American Journal of Public Health, and The Nation's Health, both publications of the American Public Health Association (A.P.H.A.)
Applied Economics, 1969-1978
Applied Statistics, 1962-1978
Biosciences Communication, 1975-1978
Bulletin of the Institute of Development Studies, 1969-1978
British Journal of Medical Education, 1960-1978
Canadian Journal of Public Health, 1965-1978
Community Development Journal, 1975-1978
Dissertation Abstracts International, 1960-1978
East African Medical Journal, 1965-1978
Eastern Horizon, 1972-1978

Econometrica, 1960-1978
Health Care Dimensions, 1976-1978
Health Education Monographs, 1975-1978
Health Manpower Policy Discussion Series, University of Michigan, U.S.A., 1973-1978
Health and Social Services Journal, 1973-1978
Health Services Research, 1966-1978
Hospitals, Journal of the American Hospital Association, 1970-1978, and their other publication, Hospital Week
Hospital Management Studies, 1965-1978
Hospital Practice, 1968-1978
Hospital Progress, 1975-1978
Index Medicus, 1960-1978
Inquiry, 1976-1978
Indian Journal of Public Health, 1970-1978
International Abstracts in Operations Research, 1965-1978
International Journal of Epidemiology, 1973-1978
International Nursing Review, 1978-1978
International Journal of Health Services, 1971-1978
Israel Journal of Medical Sciences, 1968-1978
Journal of Human Resources, 1966-1972
Journal of Medical Education, 1965-1978
Journal of Policy Economy, 1966-1978
Journal of Social Health, Nigeria, 1969-1978
Journal of Tropical Medicine and Hygiene, 1970-1978
Journal of Economic Literature, 1969-1978
Lancet, 1965-1978
Manpower, 1969-1978
Manpower Research Projects, U.S. Department of Labor, Manpower Administration, 1967-1978
Medical Care, 1966-1978
Milbank Memorial Fund Quarterly, 1964-1978
Medical Journal of Australia, 1977-1978
National Bureau of Economic Research Publications, 1920-1978
Nursing Research, 1966-1978
Operational Research Quarterly, 1974-1978
Operations Research, 1963-1978
Population STudies, 1975-1978
Program Notes, Association of University Programs in Health Administration
Public Health Reports, 1964-1978
Quarterly Journal of Economics, 1960-1978
Review of Economic Studies, 1960-1978
Social Science and Medicine, 1974-1978
Sociological Quarterly, 1976-1978
U. S. Government Research & Development Reports Index, 1968-1978
West African Medical Journal, 1967-1978
Western Economic Journal, 1962-1978
W.H.O. Chronicle, 1965-1978, WHO International Digest of Health Legislation, World Health, 1965-1978
World Hospitals, 1972-1978, Journal of the International Hospital Federation
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